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## ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

### VINCENT'S ANGINA.*

DR. THOMAS HUBBARD, Toledo, Ohio.

The term ulcero-membranous tonsillitis is not comprehensive enough to displace the term Vincent's angina. The most serious type is not confined to the tonsils.

The disease, described first by Plaut and Vincent in 1894, has very gradually assumed a place in our clinical studies. Admirable papers have been published, notably by Mayer,[1] Halsted,[2] Levy,[3] Stark, Ira Frank and others, but the disease is still regarded rather as a pathologic *curio* than a common type of throat infection. It is worthy of remark that so many of the clinical articles are reports of very serious or fatal cases. This group of fatalities in a disease that is usually transient and curable, and taking into consideration the rather scanty literature, arouses the suspicion that a large number of cases are not diagnosed. In fact, I can recall several in my own practice which I now conclude were of the Vincent's angina type. Personal reports from other physicians confirm this impression. In other words, laboratory study of all ulcers and false membranes is necessary to positive timely diagnosis.

Spirillar infections are common in the mouth and throat and there are undoubtedly different types varying in pathologic virulence. The spirochete of syphilis is a protozoon and probably this is true of the spirillum found associated with the fusiform bacillus in Vincent's angina. If this be verified spirilli and fusiform bacilli may not be transmutation forms and on this question bacteriologists have not

* Read before the Thirty-ninth Annual Congress of the American Laryngological Association, at Atlantic City, N. J., May 29, 1917.

given the final decision. As stated, the experienced laboratory worker can differentiate between the *spirillum buccalis* the *s. dentium* and the *s. pallida* by the dark field condensor. And further, in all well-developed cases of Vincent's angina the diagnosis is aided by the abundant number of spirilli and fusiform bacilli to be found if searched for properly. If not discovered in the false membrane, scrapings from crypts and granulation tissue should be tried. Mouth, and particularly alveolar ulcers show spirilli of a coarse variety as well as fusiform bacilli and it does require some study and experience to eliminate this common type in making diagnosis.

The range of pathologic lesions attributed to the Vincent's group includes the pseudo-membranous tonsillitis or pharyngitis and ulcerative tonsillitis and also the malignant type as found in cancrum oris or "noma."[4] The disease process may invade the naso-pharynx or hypopharynx and larynx and also the esophagus. Cervical adenitis and phegmonous cellulitis may develop with more or less sepsis. In fact, Vincent's angina can cause a "rude awakening" about as shocking as any disease that I know of and it is a good thing to have a plan of attack all thought out beforehand, lest one be guilty of neglect of proper treatment, ill-timed overdosage with diphtheria antitoxin or convicting antisyphilitic medication. Some Vincent's angina throats so resemble diphtheria that one is tempted to ignore the negative Klebs-Loefler findings and waste precious time on serum, but probably the most common error is to resort to mercurials or the arsenical group and perhaps condemn the victim on the resulting therapeutic diagnosis. The arsenical group is destined to play a more and more important role in specific therapy and unless extraordinary care in diagnosis be taken some Vincent's angina cases will be labelled syphilitic because certain local throat symptoms melt away under the salvarsan treatment.

The study of spirillar types of infection is developing. African fever, relapsing fever, and yaws have already been shown related to syphilis. The universal use of spirocheticides will ultimately determine the therapeutic range of the mercurial and arsenical group. Depend on laboratory findings to avoid confusion of identity of the spirillar throat infections. Do not conclude that a man has syphilis because the throat ulcer or pseudo-membranous formation clears up under salvarsan until you have excluded Vincent's angina.

Levy has recorded a case resembling Vincent's angina in which it was impossible to determine the true nature of the throat lesion

until secondary symptom developed with a positive Wassermann reaction. It would seem, however, that study under the dark field condensor should enable the expert to differentiate between the *spirillum of Vincent* and *s. pallida.* The necessity of careful study of all of these obscure cases is further emphasized by the strong probability that the arsenical group of spirocheticides exhibit a specific action in Vincent's angina quite comparable to the specific action in syphilis. There is not yet sufficient clinical data to verify this statement but it is rational and cases so far reported warrant thorough trial of this treatment.

And there is still another link in this chain that must be forged. Does Vincent's angina with marked systemic symptoms affect the Wassermann reaction? I cannot learn of any positive data bearing on this question. One case herein reported gave a negative reaction during acute symptoms and again two months after the attack of Vincent's angina. To settle this question many cases should be examined during acute, severe angina exhibiting the characteristic sepsis.

The spirilli and fusiform bacilli are anerobic and, as would be expected, are usually found associated with the cocci prevalent in all throat infections. Precisely the reciprocal role that each play cannot as yet be determined. The pathologic process may be that of more or less extensive pseudo-membranous formation or deep coagulation necrosis. The latter process, characteristic of anerobic bacilli, may progress beneath an apparently normal tonsillar surface. I have seen a case of Vincent's angina in a young man having large spongy tonsils progressing daily to a condition of sublingual edema with extensive cervical adenitis and sepsis in which one tonsil showed the ordinary pseudo-membranous deposit and the other looked like parenchymatous tonsillitis. It was not until the surface tissue collapsed into the excavation that I realized the extent of the necrosis and the cause of the sepsis. This accounts for the futility of local applications in the ulcerative type.

The disease is naturally self-limited but occasionally it lasts for weeks and deep cicatrices are the evidences of the extent of destruction, often involving muscular tissue. One fatal case, an adult, a strong, vigorous man, had an ulcerative process that involved the tissues behind the tonsil exposing the angle of the jaw and finally a large blood vessel was eroded. (This was prior to the discovery of salvarsan.) Local treatment was useless. Extraction of several teeth, curettement, and application of escharotics failed to check the

necrosis. Microscopical study of the scrapings and sections of the removed tissue confirmed the diagnosis of Vincent's angina and excluded malignant neoplasm.

Febrile reaction and sepsis are usually manifested about in proportion to the degree of cervical adenitis. These symptoms and in fact the malignancy of the disease may be determined by the degree of mixed infection. In other words, an instance of *exaltation of virulence.*

The fact that the patient has another disease in which throat infections are usual, such as the exanthemata or, even a peritonsillar abscess, does not exclude Vincent's angina. Ira Frank reports a case of the latter type and Halsted concludes that some of the chronic ulcerations and pseudo-membranous conditions labelled diphtheria or scarlatina are probably Vincent's angina. More dependence on laboratory diagnosis would clear up some of these cases. I can recall such a case of post-scarlatinal ulceration in the tonsillar fossae which was probably due to spirillar infection.

*Treatment.* Stark of El Paso calls attention to perborate of sodium as an efficacious local medicament. The nascent hydrogen dioxide penetrates and disintegrates necrotic tissue and theoretically is an ideal inhibitor of anaerobic bacterial growth. Perborate of sodium is a constituent of the foaming dental powders and has stood this empirical test with credit. *S. buccalis* and *s. dentium* are present in pyorrhoea alveolaris and here hydrogen dioxide is particularly indicated. It is less of an irritant to the normal tissue and incidentally I can recommend it in all pseudo-membranous forms of throat diseases where peroxide of hydrogen is commonly used.

I have tried most of the antiseptic throat medications and must conclude that in the ulcerative necrotic type involving spongy tonsils they are unsatisfactory. The objections to strong antiseptics is that we are liable gradually to extend the area of invasion by destroying normal marginal tissue. Goodale has particularly cautioned against this practice in throat infections. This applies also to throat washes of all kinds. The local treatment resolves itself into careful applications *limited to the diseased tissue.* The *glycerole* of *iodine*[3] (iodide of zinc 2.—idoine 3.—aq. dest. 5.—glycerine, 10) applied to the tonsil crypts, is probably the most efficacious antiseptic. It has long been used in pyorrhoea alveolaris. It is the most penetrating iodine preparation that I have had experience with and of a consistency that enables one to limit the spreading to the sound marginal area.

To sum up the local treatment advocated: Powdered perborate of sodium rubbed into crypts and necrotic tissue, a saline gargle to remove debris, and glycerole of iodine (Talbot) swabbed into all recesses with extraordinary care to protect the margin of normal tissue.

The majority of cases will yield to this treatment, repeated, of course, at proper intervals, but occasionally we will encounter the malignant type characterized by progressive necrosis in all directions and rarely, it must be remembered, invading inaccessible regions such as the lower respiratory tract and esophagus. I have not seen a record of involvement of the naso-pharynx but probably it occurs hidden by the swollen velum and tonsils.

This naturally leads to a consideration of systemic treatment and, fortunately, we have something apparently dependable in this line. Theoretically the arsenical group is specific in action and I think that experience is proving favorable. Take this type of the disease. A young man of 20 having large tonsils presented a throat that was so strongly suggestive of syphilis that a Wassermann was indicated. One tonsil was covered with necrotic false membrane, and the other enormously swollen and general cevical adenitis was in evidence. Blood-test negative, and local treatment for several days made no impression on the disease. The sublingual tissues became edematous, threatening Ludwig's angina. The collapse of the swollen tonsil surface into the necrosed fossa explained the cause of progress of the local and progressive sepsis. He was given a hypodermic of cacodyllate of sodium (3 gr.) two doses in two days and the improvement in the local condition was noticeable in 48 hours. The sublingual edema subsided and the tissues cleared up precisely as a syphilitic lesion melts away under mercurials. There was little or no indication for local treatment after three days. The throat healed with deep cicatricial evidence of true necrosis. One tonsil was more than half destroyed. This case, and several others observed in my own practice and seen in consultation, rather convinced me that this treatment, cacodyllate of sodium, 2½ to 5 gr. repeated next day (if urine is normal) is rational and probably it is good practice to try this out in all severe cases that do not yield promptly to all local treatment outlined.

There are cases, however, which need salvarsan intravenously to effectually check the ravages of the spirilli and associated germs. A case of this type: A young woman of a clean health record developed tonsillitis with a nasty, foul-smelling exudate. The tonsils, seen

prior to illness, were no larger than small chestnuts and had small crypts. They swelled enormously, filling the throat; the odor became intolerably bad. Smears and cultures were negative to diphtheria bacilli (three times) and positive as to the Vincent's organisms. Smears showed the presence of spirillar and fusiform bacilli, abundant and in almost pure culture in granulations and exudates from both tonsils. Local treatment over a period of several days was without effect. She was becoming quite septic and half starved. The cervical glands, anterior and posterior, were enlarging and tender. The characteristic odor permeated the room and I was strongly tempted to ignore the negative diphtheria findings and give diphtheria antitoxin. The cacodyllate of sodium had been given and two doses made no impression on the disease, and more serious septic symptoms were developing; fever, prostration and feeble heart action (85 and mounting to 130) on slight exertion. Dr. W. J. Stone saw the case with me and neosalvarsan, 0.6 gram. (equal to 0.4 gram. salvarsan) was given intravenously (weight, 120 pounds). The reaction was quite alarming: Temperature, 105; chills and some nausea; moderate delirium lasting eighteen hours. There followed a phenomenal subsidence of all throat symptoms. The left tonsil was found to be destroyed almost to the capsule and the right to lesser degree. All necrotic tissue sloughed away in a few days. The urine contained albumin and the patient was very weak for some time. In less than a week the throat was almost normal but the patient made a slow recovery from the general septic shock. Two months later Dr. Stone made the Wassermann test just to verify our diagnosis and, as suspected, it was negative. Four months later I enucleated the tonsils under general anesthesia and on section of tissue no spirilli were found.

It happened that Dr. Stone had a short time previous to this experience, a fatal case of this type of angina in a young, pregnant woman in whom a simple pyorrhoea alveolaris gradually developed into a septic phlegmon of the lower jaw and sublingual tissue—a horrible death from sepsis, and strangulation—and then decided to use salvarsan in spirillar infections. The case detailed above presented a hopeless condition prior to the administration of neosalvarsan. The improvement following was comparable only to that which we see in diphtheria following a proper dose of antitoxin.

Specificity of salvarsan and neosalvarsan in all spirillar infections is highly probable but a considerable number of cases must be observed before a positive opinion can be ventured.

In conclusion, I would emphasize the following:

Pseudo-membranous and ulcerative angina should be studied in the laboratory for the purpose of differentiating between diphtheria, syphilis and Vincent's angina. In doubtful cases the dark field condensor will aid in distinguishing the spirillum of Vincent from the *s. buccalis* the *s. dentium*, and the *s. pallida*.

The local treatment of Vincent's angina recommended is perborate of sodium in powder, a mild, non-irritating gargle like Dobell solution, and glycerole of iodine applied only to necrotic or false membrane areas. In cases that do not yield promptly to this treatment, cacodyllate of sodium 2½ to 5 gr. repeated in 24 or 48 hours (if the kidneys are not affected). In the malignant type, not improving under the above treatments, give neosalvarsan 0.6 grm. (average body weight adult) intravenously.

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**Inducing a Child to Open Its Mouth.**

The rough, brutal and often unsuccessful methods of inducing a terrified child to open its clenched jaws, for intubation, inspection of fauces or other purposes, would never be inflicted if the simple, painless and always successful method followed for years in Dr. Chevalier Jackson's clinic were known. A seven-inch bent probe is introduced at a gap between or posterior to the teeth and pushed backward until the distal end of the probe reaches down back of the tongue near the epiglottis. This causes the jaws and mouth at once to open. A bite-block or gag is then inserted.

## THREE CASES OF STRICTURE OF THE ESOPHAGUS DUE TO THE ACCIDENTAL SWALLOWING OF CONCENTRATED LYE SOLUTIONS.*

DR. CHARLES J. IMPERATORI, New York City.

The following three cases of cicatrical contraction of the esophagus are illustrative of the practical diagnostic methods of arriving at the location of the lesions and the safer procedure in treatment, in overcoming the stenosis, incident to the contraction.

*Case 1.* Clara M., aged four, accidentally swallowed about four ounces of concentrated lye solution on June 15, 1915. For several days following the accident, she could swallow but a few teaspoonfuls of water. For the following six months and up to the time, that I saw her, which was in December, 1915, she ate nothing but strained soups, gruels, and milk. Swallowing these fluids took considerable effort and her first appearance at the Hosital, showed her to be considerably undersized and emaciated.

Endoscopic examination, at this time revealed a stricture, situated 15 to 16 cm. from the upper teeth, this distance, in a child, probably locating the lesion between the aorta and the left bronchus. The orifice of the stricture, which was more to the right, was just large enough to get the filaform guide of the Sippy instrument through it. There was some ulceration just below the stricture. Silver nitrate, 360 grs. to the ounce, was applied once and later several applications of argyrol were made. Within two weeks the ulceration had healed.

Gradual attempted dilatation, twice a week with the 18 Fr. olive of the Sippy instruments finally passed through after three sittings. At each succeeding sitting larger sizes were used, until a 28 Fr. was used. Later Bruenings flexible bougies were used, and now, no difficulty is experienced in using the esophagoscope as a dilator.

In the early dilatation of this case, the Jackson-Guisez bougies would have been used, but they were not available. To attain the present degree of dilatation it was at first done twice a week for about six months, then once a week for the same length of time, and lately, once every two weeks.

The patient is in good condition now, eats everything, without any effort in swallowing or any occasional impaction of food. Apple skins and beefsteak are swallowed as though she never had a stricture.

* Read before the Section on Laryngology and Rhinology of the New York Academy of Medicine, Feb. 28, 1917.

Examination of the esophagus with the small Mosher ballooning esophagoscope, reveals the site of the stricture 15 cm. from the upper teeth, with a diameter of the esophagus at this point of about 11 to 13 mm.

A radiograph was taken at the beginning of the dilatation but unfortunately was lost. The radiograph taken about two months ago shows the location of the stricture and confirms the endoscopic findings.

*Case 2.* Luke C., aged 21 years, accidentally swallowed about two ounces of concentrated lye solution on September 2, 1916. The immediate treatment that he received was somewhat heroic, in that he drank over twelve quarts of vinegar water during the first twelve hours following the accident.

Although he suffered considerable pain, he was able to swallow fluids for two weeks following. At this time he suddenly found that he could not swallow. This aphagia persisted for two days, during which time he suffered very much from water hunger.

Blind bouginage, using a No. 2 Bruennings (this being the largest bougie passed), was passed daily for three weeks. At this time a piece of chicken bone became lodged in his gullet, probably at the site of the stricture. No attempt was made to remove the bone and fortunately it was expelled the following day. For five weeks nothing was done.

The patient was first seen November 25, 1916. He was just able to swallow and as it took such an effort he ate but one meal a day.

A radiograph taken at this time confirmed the endoscopic findings, which showed a stricture with some ulceration above it, at 27 cm. from the upper teeth.

The size of the stricture was less than an 18 Fr. olive. The ulcerations were touched with silver nitrate, 360 grs. to the ounce and later with argyrol. As suggested by Jackson, a calomel and bismuth subnitrate powder, ¼ gr. of the former and 10 grs. of the latter, was given four times a day. The ulceration healed within ten days. After three months bouginage, doing it somewhat irregularly, we have been able to dilate this stricture to a 28 Fr. Before dilatation was begun, a radiograph was taken by Dr. Law, confirming the location and extent of the stricture.

*Case 3.* A. J. B., aged 28 years, accidentally swallowed about a mouthful of concentrated lye solution when he was twelve years old. For two days following the accident, he could not swallow even water. He remembers having a very small diameter bougie passed every day for six months and then for a period of over

eighteen months, every other day. Thiosinamin was injected every day for six months and electrolysis was done several times. For the three years following the accident his diet consisted of strained gruels. The greatest dilatation that was done at this time, he feels certain, was never larger than 18 Fr.

When 15 years old, some food became impacted in his "throat" and after being there some time he found, that by grasping the upper part of his neck, just below the jaw, and squeezing and swallowing at the same time he was able to force the food down. Later this became a frequent happening but he was always able to overcome the impacted food and eventually get it down.

When about 16 years old, he began to notice the pouching in his neck under the jaw. This is a development of the muscles attached to the hyoid bone and jaw. He had nothing done for thirteen years, always managing to force the food down. Of course it took him some time to eat a meal and even with good mastication, he occasionally has had food impaction.

Specular examination of the lower pharynx showed slight sacculation laterally, and about 2 cm. below the cricoid, a stricture of not over 5 mm. in diameter was seen. As it was impossible to pass an esophagoscope through, for purposes of record a radiograph was taken by Dr. Law and another stricture demonstrated 34 cm. from the upper teeth. Dilatation of the upper stricture was begun in the early part of December, 1916. After several attempts a bougie the size of which was equal to a 15 Fr. was passed through the stricture. He has been dilated with a mechanical dilator, so that at present we are able to easily get a No. 10 Ingals-Mackenzie bougie through the upper stricture and have begun dilatation of the lower with this same instrument. The improvement in this man is marked.

Of course all of these cases will need considerably more dilatation, with an occasional endoscopic examination and bouginage for some time. It may be noted that all the instrumentation was done without an anesthetic, either local or general. These cases were seen at the Manhattan Eye, Ear and Throat Hospital on the service of Dr. Harmon Smith.

*Conclusions.* The reason for reporting these cases is to draw attention to the severe after results of the caustic on the tissues of the esophagus, the rarity of the necessity of doing a gastrostomy, and the method of treatment of these strictures that is safest and easiest in overcoming them,

Regarding the immediate treatment; no bouginage should be attempted until the immediate effects of the burn have subsided

and repair of the injured tissues has begun. Water hunger can be overcome by the Murphy drip and nutrient enemata. Usually within three to five days small amounts of fluid can be swallowed, without great discomfort. From this time on the patient will gradually begin to take a more liberal and regular fluid diet. Of course, should this treatment not prove of avail, gastrostomy should be done.

Later treatment is undertaken as soon as repair begins to take place, and we know this by the patient being able to take more freely of a liquid diet. The mucous membrane should be inspected in order to ascertain the extent of injury and the amount of repair under way. Ulcerations should be touched up with silver and argyrol solutions. As soon as these ulcerations begin to heal, bouginage *per tubam* should be commenced. By the use of the esophageal speculum and the esophagoscope the orifice of the stricture may be located and a filiform passed through without traumatizing the parts, as is usually done when dilating blindly. The dilatation may be started with the use of olives threaded on the filiform. For these very small strictures, the use of the Jackson-Guisez bougie is very satisfactory, particularly in those strictures under 18 Fr.

The Sippy set of olive, carrier and filiform is very useful, for safely dilating those strictures in sizes over 19 Fr. The bougies of Ingals-Mackenzie for the dilatation of those strictures from 30 Fr. up are useful, their ovoid shape rendering them easy to pass behind the larynx, and they may be left in situ, for a length of time, without much discomfort to the patient. Mechanical dilators are useful, but for most cases, even the difficult ones, the above mentioned dilators will be found to suffice.

Blind bouginage for the smaller strictures, that is, say arbitrarily under 18 Fr., is not a safe procedure. Cases that will swallow a thread to be used as a guide, can always be dilated with the Jackson-Guisez instruments with much more satisfaction to the patient and the operator. While it may seem unnecessary instrumentation to those who have successfully dilated these strictures by the sense of touch, we know and hear of cases continually that have had the wall of the esophagus accidentally punctured by blind bouginage and usually with fatal results.

Without any doubt or question, this method as suggested and practiced by Jackson, that is "bouginage per tubam" is the safest procedure to be used, especially in the smaller strictures in what at best is a difficult undertaking.

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## CLINICAL OBSERVATIONS ON A NEW IODINE PREPARATION "IODOSAN."*

DR. M. D. LEDERMAN, New York City.

About two years ago my attention was called to a new iodine powder originated by Dr. Nathan Sulzberger, a chemist of this city. He stated that his preparation differed from other iodine powders generally employed, in that the iodine content was most readily liberated, not being chemically bound as in other iodine powders.

On the basis of preliminary clinical reports received abroad, while engaged at the time in laboratory investigation, he informed me that this powder had acted with very good results in suppurative conditions in the nasal cavities, due to its great solubility in the secretions, liberating its active element without retarding drainage.

Several bottles of the powder were sent to me at that time for clinical investigation. Appreciating the penetrating properties of iodine and its active disinfectant and antiseptic qualities, I decided to test its merits in chronic suppurative disease of the aural cavity, where the advantage of free iodine liberation without the danger of retarded drainage, should prove of especial value.

My own results and those observed by a few colleagues to whom I gave some of the powder for clinical observation, show this new iodine preparation to possess decided active antiseptic properties, which appear in rather a prompt manner without disturbing drainage. The powder is an intimate association of iodine and boracic acid, prepared after a special technique, thus combining the therapeutic properties of both these serviceable agents. The powder is of a more or less brownish color, depending upon its iodine content, which may be varied in widest limits to suit special requirements. I have employed it in a two to ten per cent strength in the ear and nose, but found that the latter was too strong in the general run of cases, except in some instances of atrophic rhinitis where it could be applied without previous local anesthesia. The five per cent powder is very effective, and is usually well tolerated in the chronic suppurative otitis cases. The smarting sensation experienced at times can be avoided by preceding the use of the powder with a few applications of cocaine solution.

When exposed to air, the powder soon becomes lighter in color, showing the ready elimination of the iodine. When treated with cold water, it imparts a brownish color to the solution, which action

*Read before the Otological Section, New York Academy of Medicine, February 9, 1917.

*Jour. A. M. A., October 26, 1916.

also takes place when the powder comes in contact with the secretions or with the mucous membrane itself. When applied to the moist middle ear, the preparation is readily taken up and its activity begins. At times, in sensitive individuals, a smarting sensation may be experienced, but this passes away in a short time. In the more chronic cases this symptom is seldom mentioned. In some instances the powder was not visible in the ear twenty-four hours after its application, showing how readily it dissolved in the secretions. In a few of my cases the powder has acted with surprising rapidity, while in the more chronic cases it required longer treatment to accomplish the desired result.

If properly kept, its activity may last for quite a time, as I have used some of the preparation two years after it reached me, and obtained satisfactory results. Like all iodine products, it should be applied by means of hard rubber or glass powder blower, to avoid coming in contact with any part of the instrument of a metallic nature.

The method employed in treating the aural cases was very simple. All secretion was removed from the canal, and as much as possible from the middle ear, by means of the aural cotton armed applicator and suction. At times, some peroxide of hydrogen was used to soften the hardened secretion, and the parts dried as thoroughly as possible. The powder was then blown into the middle ear, if the opening in the membrana permitted. To have the powder reach as much of the mucous membrane of this cavity as possible, I followed the application of the powder with about ten pounds of air pressure, then blew in some more of the remedy to cover the site of perforation. No home treatment was carried out unless the purulent secretion demanded such attention or the patient was unable to come for treatment in two or three days. Then, simple cleansing at home with peroxide of hydrogen, followed by drying the canal of the ear as well as possible with cotton wicks. The powder was introduced into the canal through a paper cone. It was frequently possible to dispense with home treatment.

An interesting paper recently published by Dr. Robert A. Lambert of this city on "The Comparative Resistance of Bacteria and Human Tissues to Certain Germicidal Substances,"* has an important bearing upon the value of iodine as an ideal antiseptic. His experiments consisted in subjecting infected and non-infected tissues, removed from the body, to the action of various chemicals, including most of the germicides in common use. The relative resistance of bacteria and cells was determined by incubating the

* Jour. A. M. A., Oct. 26, 1916.

treated tissues in tissue culture preparations. In the clotted plasma, both cells and bacteria which survived exposure formed a suitable medium for growth. In such experiments, cells and bacteria are exposed under practically the same conditions as obtain in an infected wound bathed in an antiseptic solution. Staphylococcus aureus was the organism used. Human tissues were used throughout the experiments, since it seemed that the results would be of more practical value than if tissues of lower animals were employed.

Of the ten different germicides mentioned in the table given by Dr. Lambert—including mercuric chloride, potassium cyanide, sodium hypochlorite (Dakin), phenol, hydrogen peroxide, and others—he states that iodine stands out as the one germicide toward which cells were found to be more resistant than bacteria. It was possible by the use of a solution of iodine of suitable strength (1-2000) to kill the organisms in infected tissue without affecting more than slightly the growth of the cells. A 1 to 1250 solution destroyed the cells. In all the other germicides mentioned, weaker solutions than those effective against the bacteria destroyed the cells. The low bactericidal power of hydrogen peroxide was rather astonishing. A 1 to 1000 solution killed the cells, while it required a 1 to 50 solution to act in a similar manner on the bacteria. Dr. Lambert remarks that we must bear in mind the fibrin dissolving property of iodine in the healing of wounds, as fibrin serves a useful purpose in plastering together wound surfaces.

The iodine powder under consideration was also employed as an application to mastoid wounds, and it kept them clean and shortened the time of healing. In atrophic rhinitis, it retarded crust formation and stimulated the mucous membrane so that the cavities were more readily cleansed. It has also been used at Lebanon Hospital in a number of slow-healing fistulae, following abdominal surgery, the wounds closing satisfactorily after a few applications. Good results were also observed in obstinate sinuses following incision for infected breasts.

*Case 1.* September 14, 1914. D. O., male, 35 years of age, had o.m.p.c. off and on for fifteen years or more in the left ear. For the last five years, had some secretion with foul odor. No pain or other subjective symptoms. Hearing, fair. Examination showed a large, kidney-shaped perforation of the posterior portion of the membrane, with granulation protruding, odorous secretion bathing granulation and draining from opening in the drum and mucous membrane considerably thickened. A probe detected exposed bone in the posterior wall of middle ear.

*Treatment.* Removal of granulation tissue; insufflation of iodine powder, 10 per cent. As cocaine had been employed for the removal of the polyp, no unpleasantness was experienced at this visit. Two days later, after drying the middle ear, the 10 per cent powder was again employed, but in a few minutes considerable discomfort was felt, which lasted for half an hour or more. The treatment was continued with the powder after cocain anesthesia, and in six treatments the ear was dry.

*Case 2.* September 28, 1914. J. R., male, 46 years of age, o. m.p.c. in left ear, of a year's duration, following influenza. Hearing lowered. No pain or other symptoms excepting aural suppuration which required attention at times.

*Examination.* Perforation in lower posterior quadrant, with some granulation tissue protruding; secretion bathing floor of canal and membrana.

*Treatment.* Removal of granulation tissue and application of 10 per cent powder. Ear dry after seven treatments with the powder.

*Case 3.* November 6, 1913. S. P., o.m.p.c. in left ear for over ten years. Had a radical mastoid operation performed in 1906, at one of our special hospitals, which was followed by facial paralysis. This condition was not present when patient came under my observation. Ear has secreted off and on since this operation.

*Examination.* Middle ear covered with skin except at Eustachian orifice, and at upper and lower areas in posterior portion of middle chamber. These pockets were secreting mucu-purulent discharge. The probe found exposed bone at both sites.

After trying various therapeutic remedies without much success, the iodine powder reached me at about this time and was used. In about a dozen treatments, the ear became dry and has so remained. The 10 per cent strength was applied without any discomfort being experienced, no anesthetic being employed. In this case, the entire cavity of the middle ear was filled with the powder, after first cleaning and drying the suppurating areas very carefully.

*Case 4.* J. H., 8 years of age, was referred to me from one of our large cities on March 26, 1914. Following an attack of chickenpox a year previous, he had an acute suppurative otitis in the left ear, with spontaneous perforation. The discharge soon subsided. Two weeks later he was taken ill with measles, and the aural suppuration reappeared and lasted for two months, but it ceased during the summer. During September, 1913, the patient had a catarrhal attack, again followed by the aural discharge, which has persisted in spite of special treatment.

*Examination.* Perforation of the antero-superior quadrant, with muco-purulent secretion in the middle ear, mucous membrane congested. Advised removal of adenoids and diseased tonsils. This treatment was carried out at the patient's home, together with local treatment by a competent aurist.

Three months later, I again saw the young man and found a small polyp protruding from the perforation, which was removed. Muco-purulent secretions still present. Bacteriological examination showed the presence of staphylococcus pyogenes aureus and albus, from middle ear secretion. Auto-vaccine treatment was suggested, and an x-ray examination was advised. The latter was made at home, and the report stated that there was some haziness around the antrum, and the line of the sinus was obliterated, but no general mastoid involvement. The attending aurist suggested a simple mastoid operation and drainage of the middle ear from behind, before removing any of the ossicles, if the suppuration did not let up in a reasonable time. About this time the patient was again brought to me, and though the hearing in the affected ear had improved, there was considerable muco-purulent secretion. The 10 per cent iodine powder was applied after the usual cleansing process, but caused considerable pain, which was relieved by the local application of cocain solution. Three daily treatments were given after carefully drying the cavity, preceded by the cocain solution, and the ear became practically dry after the third treatment. A month later the ear was perfectly dry, and has so remained up to the present time. The action of the powder in this case was astonishingly effective.

*Case 5.* Mrs. X., 50 years of age. In 1904 the patient came to me for an old middle ear suppuration (right ear) which had existed for a number of years and had not responded to previous treatment. After removing granulation tissue and diseased ossicles, the suppuration was arrested, with an improvement in the hearing. The treatment extended over a few months. In April, 1916, following an attack of influenza and diabetes, I was called to examine the patient's throat and also found a suppuration of the ear which had not caused any discomfort or local symptoms. It was quite odorous, and had evidently existed for some time in the middle ear, but had not appeared externally. In this case, the 5 per cent iodine powder arrested the suppuration in ten treatments. Since these cases were treated, I have found that a two per cent powder is just as effective without causing local discomfort.

58 East Seventy-fifth Street

## TONSILLECTOMY IN THE TUBERCULOUS.*

DR. FRANK L. DENNIS, Colorado Springs, Colo.

Not infrequently one reads a statement emphasizing the importance of correcting all diseased conditions of the nose and throat in sufferers from pulmonary tuberculosis, with the object in view of influencing favorably the general course of the chest trouble.

Thus, Anderson[1] in an article on "The Importance of Correcting Pathological Conditions of the Nose and Throat in Patients who have Incipient Tuberculosis," after speaking of the three cardinal principles in the treatment of tuberculosis, viz: food, fresh air, and rest, says: "A carefully regulated diet may be prescribed with digestants and stomachics to encourage the stomach to perform its functions; but if the tonsils are hypertrophied, with septic accummulations in their crypts, or if there is muco-pus in the nose or sinuses, we know that the digestion will be impaired." Again, "There is such a close relation between the upper respiratory tract and the lungs, that any abnormal condition of the nose and throat should receive careful attention." "Diseased tonsils are a source of great danger to tubercular persons." Many other writers have made similar observations. I remember distinctly during my early days in this community, hearing our own Dr. Solly call attention to this point in a meeting of the county society.

I have been unable to find, in a rather superficial examination of nose and throat literature extending over the past ten years, any reports giving definite data on what the effect of removng tonsils has on pulmonary tuberculosis. Anderson himself, in closing his article, says that he could cite cases illustrating these principles but the reports would not be conclusive as other measures directed against tuberculosis have been used.

In the study of a few cases from my own practice I have had great difficulty in estimating what the direct results on the tubercular lesion has been for the following reasons:

*First*: Some cases were well on toward recovery when the tonsil operation was done and their improvement continued afterwards. It would be manifestly unfair to say that this improvement would

(1) Anderson, Willis S.: Annals of Otology, Rhinology and Laryngology, 1907, XVI, 128.

*Read before the Western Section of the American Laryngological, Rhinological and Otological Society, Colorado Springs, March 17, 1917.

not have continued had the tonsils not been removed or even perhaps to say, that it progressed the faster because of the operation. On the whole, however, the reports from the attending physicians who referred the cases to me have been distinctly favorable and although couched in general terms and being for the most part only "impressions" rather than provable facts, are, on that account none the less valuable.

*Second*: In many cases the lack of available information as to the exact condition of the patient before operation and the absence of accurate observation afterwards.

*Third*: The impossibility of judging exactly what effect the operation has had on the tubercular process.

I have collected notes of thirty-four cases from my records. Of this number there are no notes procurable after the operation in twelve as the patients disappeared from observation. Of the remaining twenty-two, the results are distinctly good in seventeen, poor in three and of no effect in one. In one of the cases tuberculosis was not recognized at the time of operation but was demonstrated soon afterwards; in five there was a laryngeal tuberculosis, in one tuberculosis of the pharynx and in one middle ear tuberculosis. Ether was the anesthetic in five of the cases, local anesthesia being used in the others. It is significant to note that two of the five cases, who had ether, did badly afterwards (cases 8 and 14), although in one (case 14), tuberculosis was not known to be present at the time of operation. The other three did equally as well as the locally anesthetized ones. Three of the cases were in persons with long standing lung tuberculosis which had become quiescent and in half of all the cases the patients' lung condition was quiescent. Only two of the cases were classed as incipient, the remainder being mostly in the second stage and a few in the third stage.

The following is a brief synopsis of some of the cases:

*Case 1.* Mrs. L., came to Colorado in July, 1913, with a third break-down from tuberculosis and was seriously ill. She had a high temperature for months. She gave a history of rheumatism, pyorrhea and tonsillitis. The tonsils were removed under local anesthesia in August, 1914. The patient has remained well since and has been living in the East for several years. Operation was undertaken after the pulmonary disease became quiescent. I do not attribute this patient's recovery to her operation. It may have contributed to her immunity since.

*Case 2.* Miss M., active, has had tuberculosis for several years; second stage case. Occasionally she has temperature and slight hemorrhages; frequent attacks of pharyngitis, tracheitis and an annoying cough; rheumatism in knees. Tonsillectomy under ether in September, 1916. She has been much improved since and her physician reports that her chest is in better shape than ever before. No more attacks of tracheitis and pharyngitis.

*Case 3.* Mr. H., in the second stage of tuberculosis, has been here over two years; frequent attacks of tonsillitis accompanied by exacerbations of the lung condition; tonsillotomy one year ago. He has tonsil stumps containing caseous crypts, enlarged cervical glands and small amount of adenoid tissue. Operation, October 17, 1906. His physician reports that after the operation he has had no more sore throats and exacerbations of the pulmonary trouble. The doctor thinks he did much better from that time on.

*Case 4.* Dr. S., active, has had pulmonary tuberculosis for years; has had for weeks a slight temperature as high as 100.4°; pyorrhea; cheesy plugs in the tonsils. Operation under local anesthesia in April, 1915. Temperature was 101° for a few days afterwards but soon came down to normal. His physician reports he did much better following operation and better still following the removal of two teeth with apical abscesses four months later. Soon went to work and has continued working since.

*Case 5.* Mr. P. is a second stage patient and was not doing very well; frequent elevations of temperature, slight hemorrhages and hoarseness. He has very large tonsils full of cheesy matter. Operation under local anesthesia, November, 1913. He has had fewer exacerbations of temperature and hemorrhages and soon recovered. Has been well since. This cannot be regarded as a quiescent case though a time of apyrexia was chosen for operation.

*Case 6.* Mr. B., active, second stage case, not doing well and had an unfavorable prognosis from his physician. A great deal of tickling in his throat; frequent sore throats. His large buried cryptic tonsils were removed in January, 1914, under local anesthesia. He has now been hard at work for two years. His cough was diminished two-thirds after operation. Doing well.

*Case 7.* Mr. R., has had tuberculosis of lungs for several years. He is an arrested case and has been at work for two years. Frequent coughs, tonsillitis and bronchitis; coughing a great deal. Temperature 99°. Operation, under local anesthesia, in January, 1917. No cough or temperature since operation and practically no post-operative soreness.

*Case 8.* Miss A. Tuberculosis for six years. Has done only moderately well. Diseased tonsils and enlarged cervical glands. Very nervous about operation, which was done under ether in May, 1916. She took the anesthetic badly and was very cyanotic. Patient reported in July that she had cough and temperature for five weeks following operation, but is feeling well now. Spent several weeks in New England during the past winter where she had an attack of influenza, returning in February with renewed activity in lungs.

There is no doubt that the lung condition was lighted up by the effect of the ether in this case although this possibility was considered by her family physician and myself and it was decided for other reasons to take the risk. She apparently recovered from that flare-up and the present condition is, no doubt, directly due to the unfavorable environment and her activity while she was east.

*Case 9.* Mr. S. has been tubercular for one year; hoarseness, throat sore. Has large buried cheesy tonsils which were removed under local anesthesia in February, 1914. One month later he complained that his throat was sore. He had an inflamed spot in both tonsil fossae which aroused the suspicion of a tubercular infection at this point. This got somewhat better and the diagnosis was never confirmed as the patient left here and I have no report from him since. His larynx showed distinct signs of tuberculosis in March.

*Case 10.* Dr. C. Active tuberculosis of the lungs for one year and of the larynx for eight months. Afternoon temperature 99°; cough, expectoration, lungs moist. Large cryptic cheesy tonsils removed with local anethesia in June, 1912. One month later the cough had decreased and the temperature ceased. In September he went to work and has been at work since. No active signs for years. Voice almost normal. This man was evidently greatly helped by the operation.

*Case 11.* Mr. B., first seen in February, 1916. Second stage case. He has had lung tuberculosis and hoarseness for five months. His larynx and one ear are tubercular. Under treatment the larynx and ear improved considerably as did his lungs, although he had wide-spread trouble. His large and diseased tonsils were removed in an effort to affect favorably his tubercular condition. Operation on November 7, 1916, under local anesthesia. A good deal of troublesome hemorrhage complicated the operation and the pillars on both sides were sutured over gauze. Notwithstanding this, a secondary hemorrhage occurred a few hours later on the right

side and more packing and sutures were necessary. A large hematoma in the soft palate resulted and altogether the patient had a very trying time. For two weeks, prior to operation, his temperature had varied between 98° and 99°. Following the operation it rose to 100° for one day, was 99° the next day and did not go above normal afterwards. The patient went to work in January and is generally doing well, although his laryngeal condition was worse for a time. This is now better but is still being treated. The ear is dry with a small perforation. This patient went to work against advice as his condition is not such as to warrant it, yet he is really holding his own very well. He also developed a suspicious-looking spot in one tonsil fossa a few weeks after operation which has now healed completely.

*Case 12.* Mr. M.; third stage case. Has tuberculosis of the posterior pharyngeal wall and a small tubercular ulcer on the left tonsil. Against my judgment and advice the left tonsil was enucleated under cocaine anesthesia and tuberculosis of the wound promptly developed. Patient was desperately ill and died two or three months later.

*Case 13.* Mr. C. has had fibroid phthisis for three or four years. Second stage case. No temperature for three months; very little cough or expectoration but is annoyed by a constant "clearing" of his throat. Small buried tonsils were removed in September, 1914, under local anesthesia. The most annoying "clearing" was not influenced by the operation nor by any other measures, including treatment through the bronchoscope and by intratracheal injections. His general condition is good and he has been at work on a ranch for two years.

*Case 14.* Child, three years old. Seen first with acute tonsillitis. Cervical glands not enlarged at the time but were palpable two months later, at which time the operation was performed under ether anesthesia. Patient did not pick up after the operation and six months later the attending physician reported that it was running a temperature of 99° to 101°, the reaction to tuberculin was positive and there was probably tuberculosis of mesenteric or bronchial glands. Subsequent history unknown.

In operating upon these tubercular cases, certain precautions should be observed. A time should be chosen for operation when the general condition is favorable and the lungs are relatively, at least, quiescent. Ether should be avoided whenever possible. In certain nervous cases it seems imperative to give a general

anesthetic because it is a question whether the psychic shock is not greater in these with local anesthesia, especially if troublesome hemorrhage is to be expected. Although it cannot be mathematically proven that the lung condition is directly influenced, the universal opinion of all who have observed these cases is that they get along much better afterwards. There are many cases who reach a certain point in their improvement from the lung lesion and get no further and who, after a needed tonsillectomy, find their general resistance so increased that they proceed more rapidly to a full arrest of the disease. Laryngeal tuberculosis *per se* is certainly no contra-indication to operation and is many times much helped by a tonsil enucleation. In the presence of actively spreading ulceration of the larynx, especially when involving the epiglottis, one would avoid operation. But with a healing larynx or one with only slight involvement, operation may be undertaken if other conditions are favorable. The presence of tubercle bacilli in the sputum is no contra-indication, but in the presence of copious expectoration, I should feel, there is more danger of wound infection.

The post-operative care of the wound is especially important. It has been my custom to apply tincture of iodine once or twice daily until cicatrization is complete and in one case the whole surface was painted with trichloracetic acid immediately after the operation. I once saw a galvano-cautery used in the same way.

After reviewing my experience and that of my colleagues in this region, I feel justified in the belief that tonsillectomy in these cases, when indicated (and the indications for operation are practically the same as for the non-tubercular cases), is practically devoid of danger, either from local infection or from lighting up a slumbering process in the lungs, provided one uses ordinary judgment in the selection of cases. Of course, no one would think of operating in the presence of marked activity in the lungs as manifested by fever, rapid pulse, sweats and declining weight and strength. But a time can be chosen when these symptoms and signs are in abeyance and then good results may be expected.

501 North Tejon Street.

## COMPLETE UNILATERAL DEAFNESS RESULTING FROM ACUTE PAROTITIS. REPORT OF A CASE.

Dr. George H. Willcutt, San Francisco.

As so few cases of this interesting condition, especially in adults, have been reported in the medical literature of the past few years, the writer wishes to present the following report in hopes that it may be of interest to the general practitioner as well as the otologist. Osler, in his "Modern Medicine," states that of the ear complications of acute parotitis, deafness is the most frequent. Texier has collected thirty-four cases of deafness following mumps and in seventeen of these it was bilateral, the other 50 per cent being unilateral. In many of these cases there was tinnitus and "buzzing in the ears." In thirteen cases vertigo, lasting from a few hours to a few days, was present and in four cases there was vomiting. The deafness comes on about the fourth or fifth day, sometimes as late as the tenth or fifteenth day.

It is not the purpose of this paper to discuss the pathology of this condition or to locate its primary lesion as a great diversity of opinion prevails among those who have studied the condition as to whether it is in the middle-ear or in the internal-ear and the study of a single case will not allow of a definite conclusion.

*Case Report:* Mrs. L. H., 29 years of age, occupation, clerk. No ear disease as a child. No pain in the ears at any time. Normal hearing when examined for employment with the telephone company seven years ago. Had measles and whooping-cough in childhood. Recurrent attacks of tonsillitis during girlhood. Has one child 10 years old. No miscarriages.

May 27, 1916, acute parotitis developed. Swelling bilateral and equal. No temperature. (Family physician attending.)

May 29, attack fully developed. Acids caused great distress.

June 2, nausea, vomiting and vertigo all day. Unable to lift her head from the pillow.

June 3, nausea and vomiting in the forenoon. Drank broth at noon. Vertigo continued but to a lesser degree.

June 4, no vomiting, only slight nausea. Vertigo persisted.

June 5, patient arose occasionally, but could not walk without staggering. Had to lie down every few minutes. This condition continued about a week.

June 15, patient noticed impaired hearing in the left ear when using the telephone and "ear felt peculiarly."

June 22, visited a specialist, who told her it was a "catarrhal deafness" and did an inflation of the ear without benefit.

June 23, patient visited the writer and the hearing tests showed a complete deafness of the left ear and a normal right ear. Both ear drums were normal in appearance, position and mobility. Both Eustachian tubes were patent. Started Tab. Strych. Sulp. gr. 1/50 t. i. d.

June 30, no improvement. Vertigo continues to a much lesser degree. Strych. Sulph. increased to gr. 1/30 t. i. d.

July 5, no improvement. Vertigo still present.

July 17, admitted to Southern Pacific Hospital. Began injections of 2 per cent pilocarpine hydrochloride solution, M5. Good reaction.

July 19, repeated injection M5. Good reaction. Blood pressure 130.

July 21, injection MM6. Good reaction. Wassermann negative.

July 24, injection M8. Good reaction. Urine negative.

July 26, injection M9. Good reaction. Catamenia present.

July 31, injection M9. Poor reaction.

Aug. 2, injection M10. Very good reaction.

Aug. 4, injection M10. Good reaction.

Aug. 5, no improvement in left ear. Patient discharged from hospital.

Sept. 7, hearing tests show no change in affected ear.

Oct. 23, examination shows complete unilateral deafness still present. Vertigo in attacks but to a minimum degree, being most noticeable when turning to the right. Turning tests show marked horizontal rotatoric nystagmus and vertigo to the left after turning ten times to the right, duration 16 seconds. Turning to the left ten times produced a mild horizontal, rotatoric nystagmus to the right lasting 28 seconds, patient experiencing only slight vertigo.

310 Physicians Bldg.

## PNEUMOCOCCIC MENINGITIS FOLLOWING ACUTE SUPPURATIVE OTITIS MEDIA.

Dr. J. Clothier, Pocatello, Idaho.

The following case is interesting because of the rapid development of a fatal meningitis in a patient suffering with acute suppurative otitis media who at no time during the course of the disease presented any signs of mastoid involvement.

J. B. E., male, age 21, came to my office on May 28, complaining of severe pain in the right ear. He had first experienced slight pain in this ear several days before after swimming, but it had been severe only during the last twenty-four hours.

Examination of the right ear showed intense congestion of the tympanic membrane, with slight bulging. There was no swelling or tenderness over the mastoid or in fact any symptoms indicative of mastoid involvement at any time during the progress of the disease. Temperature 99°; general condition good.

Incision in tympanic membrane was advised but the patient refused. Hot bichlorid irrigations to be followed by the instillation of 12½ per cent phenol in glycerin were ordered. The following morning the ear felt considerably better, but he was again counselled to have an incision made, but he steadfastly refused. On the following morning, the pain having increased in intensity during the night, he consented to the operation and a free incision was made in the membrane under nitrous oxid anesthesia. There was an immediate discharge of thick, creamy pus with marked alleviation of pain. The hot irrigations were kept up and the next day the patient felt fine, the ear discharging copiously. Upon the morning of June 1, or nearly forty-eight hours after operation I was summoned to the patient's residence. His sister, a trained nurse, reported that he had slept well part of the night, but that for the past four hours he had been very restless and had complained of severe headache. I found him tossing about in bed, at times talking irrationally and complaining of excruciating pain over the entire head. The ear was still discharging freely. The restlessness and twitching of the muscles increased and he became delirious within an hour. No tenderness or swelling over the mastoid was present. Immediate operation was advised and the patient was removed to

the hospital where restraining straps were necessary to keep him in bed. Divergent strabismus and inequality of the pupils developed the muscles of back stiffened and the head became retracted. Ophtalmoscopic examination was negative.

Spinal puncture was made to relieve pressure and for the purpose of microscopic examination of the cerebro-spinal fluid, but only a few drops were obtained, the intense swelling of the meninges having probably obliterated the communication with the spinal canal. Bacteriologic examination of the spinal fluid showed a pure pneumococcic infection. The pneumococci also predominated in the aural secretion. A near relative objecting at this time to operation until a surgeon from a distant city could be summoned for consultation, the operation was deferred. The patient gradually passed into a comatose condition and died before the arrival of the consultant.

Kane Building.

**Gritting the Teeth as a Sign of Adenoids.** C. E. BENJAMINS, *Nederl. Tijdschr. v. Geneesk.*, Feb. 17, 1917.

Benjamins states that in his experience with 250 cases of adenoids in India and 526 at Utrecht, as also in the experiences of others, comprising a total of 1,544 adenoid cases, a tendency to grit the teeth was manifest in from 25 to over 40 per cent, an average of 34.1 per cent. In his own experience the average was 37.2 and 34.6 per cent. In his 776 cases there was snoring in over 60 per cent; enuresis in 29 per cent; aprosexia in 34.6 per cent, and disturbances in hearing in 42.7 per cent. In 153 operative cases of adenoids, the gritting of the teeth stopped after the removal of the adenoids, and in fourteen it became much less, but it persisted unmodified in fourteen. Examination of 1,654 schoolchildren showed gritting of the teeth in 13.6 per cent. Benjamins is confident that the majority of the teeth gritters will be found to have adenoids. In a series of 115 teeth gritters examined for affections other than adenoids, all but two were found to have adenoids. In 10 of the children the teeth gritting was the only anomaly to attract attention, but a large adenoid was discovered in four. ED.

## A DEVICE OR ARTIFICIAL EAR DRUM FOR USE IN IMPAIRED HEARING AND FOR THE PREVENTION OF CONCUSSION DEAFNESS.

Dr. Edward Baum, Philadelphia, Pa.

This is an artificial device designated to be used in cases of defective and impaired hearing. It is adapted to insertion into the external auditory canal in such a manner as to be brought in a smooth and correct coaptation with the membrana tympani without causing irritation or pain. It provides an artificial ear drum, suspended perpendicularily concaved, and retained in this position by four roll-like folds in continuity with multiple cornucopial or cone-shaped sound accumulators, in which the outer or distal expanded openings are largest, gradually diminishing their lumen toward their approximal ends with smaller openings into an expanded or ampulla-like cavity in front of the artificial drum. The continuation of the outer folds of the accumulators expands outwardly with another roll-like fold continuous with the perpendicular circular surface diaphragm or artificial drums, approximating the natural drum or membrana tympani. The outer roll-like surfaces of the megaphone appendages afford a cushion-like contact with the canal walls, conforming with and permitting an easy and flexible support to the perpendicular surface diaphragm or artificial drum. The formation of these roll-like appendages is such as to afford ample intervening space for ventilation and drainage, and for sustaining the membrana tympani while the artificial drum holds it in position.

The material used, which has been found to be of the best advantage, is the finer grade of oiled silk prepared by Wright Brothers of Philadelphia, and below is illustrated and shown the different steps and forms necessary to arrange the finished form which in practice will give satisfactory results.

Figure A designates a blank cut from oiled silk which is smooth, elastic, pliable and flexible. The outer edge forms a plurality of rounded surfaces (2), which in the form are four in number. The body portion is provided with radial slits or cuts (3, 4, 5, 6), which communicate with the circular cuts (7, 8, 9, 10), respectively. The circular cuts are, preferably, substantially one eighth of the circle. The blank is then folded into position seen in Figures 2 and 3, and the juxtaposed edges are cemented as indicated at 11. This forms

at one end a flexible disk at 12 (Figure 4). In the form illustrated these are four in number. These appendages are in continuity with the disk and are sustained by the four pillar-like supports (14) (see figures 3 and 4) and four openings (15, Figure 4) are provided in proximity to the disk (12). Figure 6 designates the inserter, which is provided with four slits (17) at its forward end, which are adapted to engage the pillar supports (14, Figures 2 and 3) in order to insert the artificial drum in place.

Impaired or defective hearing or deafness may be attributed to many and various causes. It is not the writer's purpose to consider cases of mutism, auditory nerve paralysis or congenital anatomic defects and malformations. Fortunately these are few, compared to those we term catarrhal, and a consequence or sequence to causes occurring in the upper air-passages. Reference is here made to the results of mechanical treatment to which the middle ear and tympanic membrane are subjected when catheterization

Fig. A.

with inflation or politzerization is a necessary part of the treatment to relieve the vacuum and correct the existing catarrhal condition. There is no question that the treatment usually instituted proves successful in this particular.

Reference is especially made to the harm that the indiscriminate and abusive use of politzerization in conjunction with the Eustachian catheter may do, even in the hands of the most cautious experts. This will be observed when it is attempted to forcibly empty the contents contained in an 8-ounce Politzer bag into the middle ear (the capacity of which is possibly 10 to 15 minims), even filling the cavities of the nostrils, or when compressed air at a pressure ranging from 8 to 20 pounds is used. When the anatomic structure is remembered (that the membrana tympani is the point of least resistance, and is the only part that will yield or give way to this superfluous air pressure) rupture has occurred, and has been found responsible for conditions hereinafter depicted.

Under air-pressure force the membrana tympani is converted into an internal concave or external convex surface, instead of an external concave, or plainly, a bulging outward in comformity to

various degrees. If thickening of the tympanic membrane is marked it resembles a good-sized pearl. Accompanying this occurs the distortion of the chain of bones (ossicles), throwing them out of alignment, suspending them and stretching them in a straight line from fenestra ovalis to the membrana tympani, a repetition of which will tend to chronically disturb their equilibrium; a sequence as is shown hereafter.

Figure 1 illustrates in this instance, for comparative methods, a normal ear showing the cup-in shape of the drum and the proper angle and alignment of the ossicles. This cup-in shape is adapted to the accumulation and concentration of sound. The angle at which the ossicles are suspended allows vibration to be transmitted to the inner drum or fenestra ovalis.

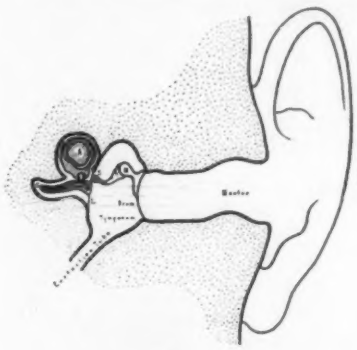

Fig. 1.

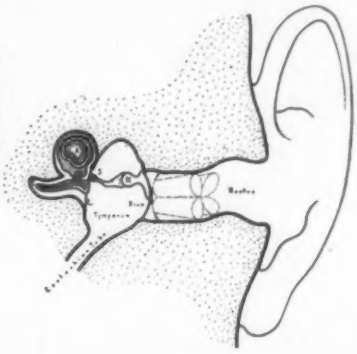

Fig. 2.

Figure 2 shows, in contrast to Figure 1, the distended drum—the effects of chronic insufflation, politzerization, or too forcibly blowing the nose, forcing the air into the middle-ear cavity, distending the drum and throwing the little bones out of alignment, and causing a locking of them also. The air which has been inflated and absorbed has created a new vacuum, but the locking of the bones prevents the vacuum from drawing the drum inward into its exaggerated concave condition, as is frequently found in the ordinary occlusion of the Eustachian tubes, where a vacuum has been created in the middle ear, and insufflation has not been carried on.

In this new vacuum, which has been created by the absorption of the air, the pressure is directly along the stretched ossicles, inward and toward the inner drum or fenestra ovalis. It is in this

condition that the tinnitus aurium is most distressing at times, more so than where the vacuum existed with the drum drawn in.

Where the drum has been chronically distended, as is shown in the Figure and a vacuum exists, inflation that would relieve an existing vacuum under other conditions, like the drum being cupped inward, exaggerates it by distending the outer drum further, drawing on the ossicles and putting a greater strain outward upon the inner drum, as illustrated in the figure above. Where the bones are not locked and the increasing vacuum draws the drum inward and brings the bones to an angle, bringing with it the drum and cupping it inward, the vacuum increasing the pressure is then made against the inner drum also.

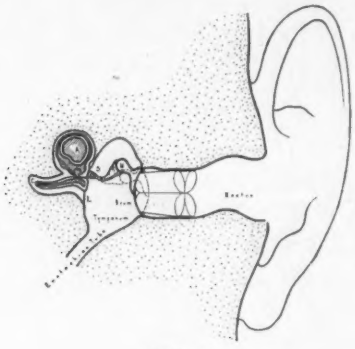

Fig. 3.

In this condition insufflation by inflating the middle ear will force the drum out and bring the bones back into line again.

The return of the vacuum will draw the drum back again. Frequent inflation will cause the drum to become flabby and the vaccum increases internally and draws the drum back again. Inasmuch as the vacuum has to be relieved, however, the tension is one way or the other. Where the drum is forcibly distended, it draws upon the inner drum. Where the drum is cupped inward in its normal state, and the vacuum exists, it pushes upon the inner drum. There also exists in this condition an increased amount of fibrous tissue in the drum, causing a thickening. This thickening varies in degree of severity, and in the exaggerated form, the outer rotundity of the drum resembles a pearl in shape and in color. Transparency of the drum suffers to the extent of the thickening and at the expense of the hearing.

The drum being distended or cupped outward, sounds are disseminated, while in its natural cup-in shape, it collects or accumulates sound. There is confusion on the part of the individual who can hear sounds, but has trouble in distinguishing what they are or from whence they come.

The ear device is intended to forstall and prevent mechanical disturbance in cases where repeated and forcible inflation is a necessary part of the treatment, and acts as a cushion-like buffer. The resilient properties of the oiled silk neutralize the shock of the opposing force. The conforming concave artificial drum recoils, reinforces, retains and sustains the membrana tympani. Where vibratory nebulization with rapid interrupted inflation is instituted

Fig. 4.

Fig. 5.

the resilient recoil of the artficial drum proves an efficient adjunct in internal middle-ear massage.

Figure 3 illustrates the correction. This is brought about by the presence in the ear of the phones. The cup-in shape of the artificial, drums against the natural drum, raises the little bones in turn and re-establishes the cup-in shape of the natural drum. The dotted line illustrates the distorted condition shown in figure 2.

Retaining the device in position acts as a delicate splint, enabling the membrana tympani, ossicles and ligaments to regain their tonicity.

Further inflation can be instituted with impunity, while the device prevents reoccurence of overdistention by the convex surface of the artificial drum conforming with and retaining the concaved surface of the membrana tympani. Favorable results have been obtained in cases of what is here termed bulging or distended mem-

brana tympani, the result of too forcible inflation or too frequent politzerization. We may also include cases of too forcibly blowing the nose, attended distortion of the ossicles, attended with tinnitus aurium, confusion of sounds and the inability to understand them. From the description of the device it will be observed that it is applicable in these cases by a simple insertion coaptating the artificial drum with the membrana tympani. It is instrumental in readjusting the distended drum into its normal concavity, realigning the ossicles, thereby relieving strain, lessening tension and tinnitus. Improved hearing readily follows.

Among the many causes of deafness and difficulty in hearing are loud noises from hammering upon metals, shipbuilding, boiler-

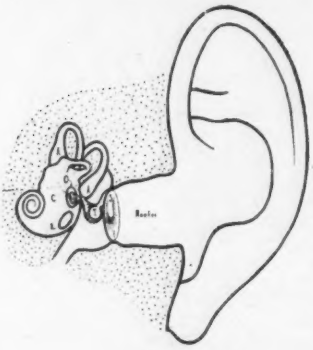

Fig. 6.

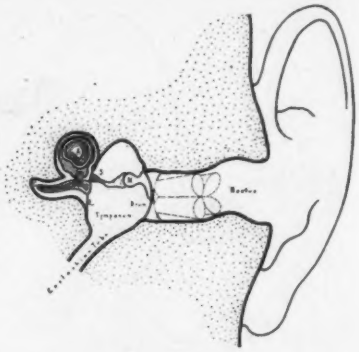

Fig. 7.

making and riveting on steel structures and buildings, concussions, explosions and reports of large guns at training grounds, aboard ship or land. Any condition where terrific vibrations reach the membrana tympani and throw it into a state of contraction, not only violent, but of continued or long duration, as in factories of all description where there is a great deal of machinery noise and vibration from the clatter of machinery may cause deafness.

These terrific vibrations bring about a chronic thickening of the membrane tympani with distention from insufflation in the effort to overcome the existing vacuum. There may also be present catarrhal condition involving the Eustachian tubes with swelling and occlusion, creating a vacuum, and congestion of the middle ear, attended with stiffening and fixation of the joints of the ossicles.

A peculiar condition which may also be the paramount symptom here, is that the individual can hear better in those loud noises

than in quiet places. Tinnitus aurium is distressingly present during this time. Bone conduction is also marked very acutely at the expense of what is here termed "air conduction." This device is splendidly applicable in preventing deafness from these causes, arresting its progress and relieving or correcting it after it has developed.

In order to prevent boilermarkers' deafness or its like, it is only necessary to insert the instrument into the canal, not quite adjacent or coaptating the artificial drum with the natural drum. This affords a little air space or air cushion between the two drums (see Figure 4) and all the vibrations, noises, reverberations, and irritation will be received upon the artificial drum. The air cushion, so-

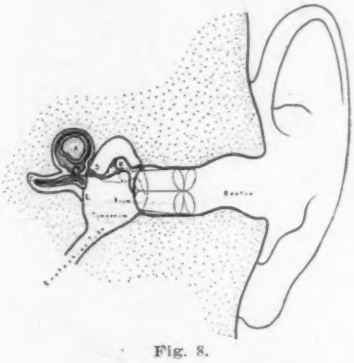

Fig. 8.

Fig. 9.

called, prevents the vibrations from reaching the natural drum or membrana tympani. It is worn as long as the patient is subjected to loud noises. On leaving this atmosphere the instrument is simply pushed back or the artificial drum coaptated with the natural drum as in Figure 5.

It is worn until the patient returns to the noisy atmosphere, when the device is again slightly withdrawn, affording the air cushion shown in figure 4. This will prevent the progress of the deafness and will protect the drum from further involvement or arrest the cause. It also applies when the deafness has progressed in the foregoing manner. While the device is worn in coaptation with the natural drum the alterative action is brought about and progresses in this manner:

The presence of the device in the canal, adjacent to the membrana tympani provides a stimulus, increasing the circulation

thereto, attended with body heat. This local heat upon the device is reflected upon the parts as an unnatural heat, causing sweating, softening, exfoliation and thinning of the membrana tympani. The resilient concave gentle pressure of the artificial drum tends to conform the distended convex membrana tympani, retaining it and sustaining it into a more normal concavity, releasing the strain upon the ossicles and relieving the existing tinnitus, with increased secretions of the lubricant (cerumen). The production of this cerumen is stimulated by the device remaining in the canal. Improved function is noted in from six weeks to two months.

The absolute removal or changing of the phones becomes necessary only when the accumulated secretions are of such an amount

Fig. 10

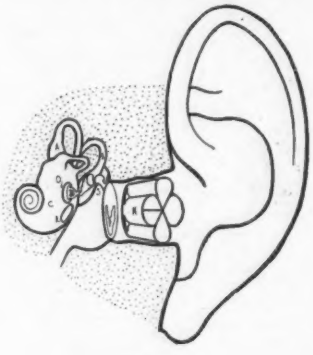

Fig. 11.

as to cause annoyance or prevent sound from entering the little dilated megaphonic entrance into the ampullae and in turn upon the artificial drum. When fresh devices are inserted, further and gradual improvement follows. The persistent and continued wearing of the device for a term of two years terminates gratifying results, at which time the individual may continue to wear them as a preventive and a protection to the ear. The use of this device by those who are subjecting themselves to loud noises, will also prevent deafness or failure of hearing. Inasmuch as there may not be any deafness present, the device may be worn directly against the natural drum.

It is advised and recommended for the use of artillerymen or gunners of the Army and Navy, or in training grounds where guns are being tested. It is a preventative of rupture, puncture or destruction of the membrana tympani, and where such destruction

has been done, even to the complete destruction of the membrana tympani and ossicles, leaving the middle ear exposed, resulting in discharge and impaired hearing, it has proven very beneficial, adding comfort and increasing the hearing of the individual.

In sclerosis with adhesive inflammation of the middle ear with ankylosis, thickening and distention of the membrana tympani, an hypothesis is advanced, assuming that the alterative action could be brought about in the middle ear and canal by the application of the device based upon its size, shape, applicability and the effect of the impermeable material (oiled silk) of setting up a stimulation and maintaining a resolution.

Figure 6 illustrates an infrequent and stubborn condition, very difficult to overcome. Inasmuch as the clinical histories of these

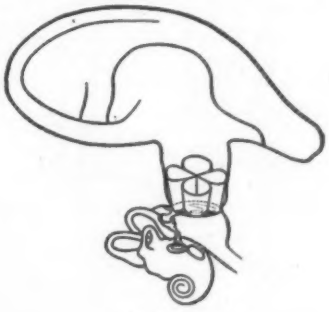

Fig. 12.

cases are analogous to those conditions described in Figures 2 and 3, the cause is attributed to catarrh. Treatment which had been instituted included inflation to overcome the vacuum. This distended the membrana tympani, but when the vacuum reoccurred, instead of the ossicles readjusting themselves to the proper superior angle, there occurred a lateral twisting or rotation of the malleolus-incus articulation with an inferior angle below the meridian line, the opposite of the natural angle of the ossicles. A speculum examination with reflected light revealed a very prominent projection of the lower segment of the malleolous, appearing as if it would protrude through the membrana tympani. Following upward to the articulation with the incus revealed it resting against the inner surface of the membrana tympani, resulting in a condition which I have designated: "The duck-wing displacement of the ossicles." The contour of the membrana tympani in this condition is always found to be exaggeratedly concave (as depicted

in Figure 6), retracting the membrane forcibly and plainly revealing the outline of the ossicles. I discovered this condition during my clinical research and found that it occurred in about 10 per cent of the cases. The application of my device enabled me to overcome the mechanical displacement which was so plainly outlined.

In order that correction may be brought about, two steps are required. In the first place, this is a condition where forcible insufflation is necessary to bring about the distention of the drum, and with it, bring the ossicles into a line, or up to the meridian line as illustrated in Figure 7. Second, while this increased amount of pressure remains in the tympanum, the device is promptly inserted into the canal, bringing the two convex surfaces of the artificial

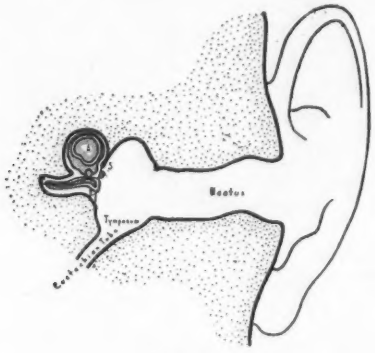

Fig. 13.

drum in coaptation with the distended natural drum. The resilent properties of the artificial drum, by making gentle pressure in an upward and inward direction, re-establish the concave condition of the natural drum, bringing with it the upward or superior angle, replacing the ossicles in their natural position as shown in Figure 8:

The artificial drum, suspended in a penumatic way in the canal with just sufficient pressure to hold the device in position, retains the membrana tympani in its corrected position. A comparison could well be made here to the previous condition wherein a simple distended drum, with the ossicles on a meridian line, was likewise corrected. To this exaggerated condition, brought about by further overdistention of the drum, straining the incus-malleolus articulation to the extent that the vacuum returned, caused a downward displacement. The maintenance of this corrected position, of the

membrana tympani with the ossicles, is in the nature of a splint and enables nature to rehabilitate the ligamental structure of the articulation, restoring its function with an increased percentage of hearing.

The variety and degree of injury to the drum from abscesses or direct violence range from a pin point to a punctured, perforated or ruptured drum with serrated or irregular edges, varying in degree of destruction. Discharge usually accompanies these several conditions. The discharge may result from exposure or irritation from without, and will either drain out as mucus, or being retained in the middle ear undergoes a change and comes away in the nature of pus. Discharge may be the result of the sloughing of the ossicles or other destruction going on in the middle ear. Yet,

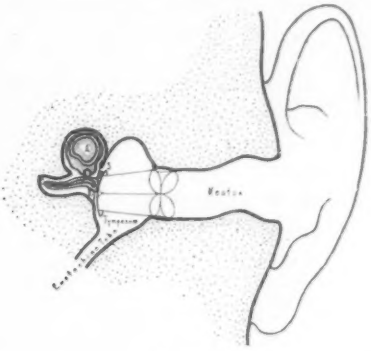

Fig. 11.

discharge has been kept up from exposure of the delicate mucous membrane of the middle ear to cold drafts, winds, dust and other irritating properties. The same causes apply to the middle ear when it is exposed. Where the discharge comes from exposure alone, the condition is easily overcome by the use of the device.

Figure 9 illustrates a ruptured drum with serrated edges exposing the middle ear to a more or less degree.

Figure 10 illustrates the correction with the device substituted for the perforated drum or membrana tympani.

Figure 11 illustrates an irregular perforation in the lower segment of the drum to the extent of removing its support, permitting a sagging downward of that part of the drum covering the malleolus and bringing about a disarticulation of the incus, the result of trauma.

Symptoms manifested resemble those accompanying antrium disturbance; dizziness and irregular gait, a slight inclination of the head toward the impaired ear, marked impairment of hearing, with lessened bone conduction (detected by tuning fork test) resembling nerve impairment.

Figure 12 illustrates an absolute correction: (1.) By a perfect substitution for the perforated drum. (2.) By coaptation of the convex surfaces of the artificial drum with the membrana tympani, thus re-establishing the concavity of the natural drum, causing in turn juxtaposition and re-articulation of the incus and malleolus, acting as a perfect splint and retaining them in position with favorable results. The disturbing symptoms were removed and the hearing improved.

A case of complete destruction of the membrana tympani, including the condition when the drum and ossicles have been entirely removed, leaving only the stump of the stapes, either from operation or sloughing, is ilustrated in Figure 13. This condition is usually accompanied by a discharge which originally comes from exposure of the middle ear, or too forcibly blowing the nose, which forces the mucus from the back part of the nose and the accumulations that have lodged in the Eustachian tubes, through the tubes into the middle ear. This accumulation, if allowed to remain, undergoes a change and drains from the ear as pus.

Figure 14 illustrates the complete substitution of the drum and bones, reaching from the remnant of the rim of membrana tympani, spanning the chasm across to the stump, still adherent to the fenestra ovalis, fulfilling every requirement and proving a perfect substitute as an artificial drum.

This substitution enables the patient to hear.

It also hermetically seals the middle ear, protecting it from further exposure, and allows nature to rehabilitate the lining of the middle ear, bringing about a restoration of the delicate mucous membrane and affording much comfort to the individual. Hearing improves from 40 to 80 per cent immediately upon the insertion of the instrument, further improvement resulting from the alterative action of the device.

### Case Reports

*Case A.* E. A. C., student, age 18 years, came under observation, May 29, 1917, with the history of scarlet fever when a child. It left him with discharging ears and impairment of hearing, which handicapped him much in his studies. He was about to enter the high school and felt the need of his hearing more acutely.

*Examination:* General condition good. Well developed. No symptom of any other unfavorable condition. Right eardrum perforated, showing

destruction of the inferior half, laying bare the niche of the round window. The inner walls of the cavity were covered with a mucus, which was draining into the external canal. The left ear showed more destruction, revealing the handle of the malleus free. The round window in perfect view. Hearing, right ear, watch test, one inch. Left ear with even more of the drum destroyed, hearing was two inches and a fraction.

*Treatment:* Cleaning of the canals and swabbing of the cavity. Placing the artificial eardrums in position increased the hearing: right ear, six inches; left ear, eight inches. The patient returned once a week for four visits; then once in two weeks for four visits, when the artificial drums were removed, the cavity cleaned and fresh drums replaced. At the present time he is to return when he feels the necessity for a dressing, about an average of once a month.

He has no trouble in hearing. His teachers' conversation is heard and understood with ease.

*Case B.* M. J. Y., age 34. Clerk by occupation. First visit October 12, 1916.

*History:* Measles and diphtheria in childhood. Abscesses in both ears and also discharge from both ears. A dripping sensation from back part of the nose upon palate. Head noises of a ringing character. Treatment for catarrh and, as he expressed it, "all kinds of treatment for ears." General health good. Used tobacco (smoked) moderately.

*Examination:* Post-nasal catarrh; mucous membrane turgescent and boggy. Middle ear exposed; drum and ossicles absent. Hypersecretion of a watery nature from mucous lining of the middle ear. Hearing tested with watch: right ear, two inches; left ear, one inch.

*Treatment* consisted of usual cleaning and nebulization to clean out the Eustachian tubes. Middle ear cavity swabbed with alcohol; artificial drums applied. Test showed immediate improvement in hearing; equal distance from both ears, ten inches. Returned November 9, 1916. Secretion less in amount; marked improvement in hearing. Dressing and application of fresh drums. Living in a distant town, the patient was furnished with six pairs of drums, with instructions to take care of himself. Returned July 25, 1917, improved. Again on August 15, 1917. Last time, September 17, 1917; results favorable. The patient applies the drums himself and will return at intervals of three months.

*Case C.* T. G. O., age 42, merchant. First visit, July 12, 1917.

*History:* Temperate; active. General condition good. Had catarrh of the nose, head and throat, and treated by specialists with sprays of different kinds. Air was forced into his ears during treatment. He, too, had done so, and had made his ears crack when forcibly blowing his nose. Feeling of dryness in back part of nose and sensation of dripping into throat. Head noises of ringing, buzzing and hissing nature.

*Examination:* Nose, turbinates, nearly normal; mucous membrane slightly congested. Post-nasal palate and surface dry; lumpy mucus adherent to posterior wall of pharynx. Ear channels dry, scaly; no secretion of cerumen. Drums dry, thickened, convexed, distended. Handle of malleus prominent (Illustration No. 2). Ossicles displaced. Could hear watch tick in direct contact with right ear. In contact with left ear, distinctly.

*Treatment:* Alkaline sprays to post-nasal and palate surface, nebulized with oil base. Inserted artificial drums coaptating with natural drums. Hearing improved. Right ear, watch test, not quite in contact. Left ear, watch test, one inch away.

June 17, 1917, returned. Complained that some soreness had existed for first three days after insertion. This subsided. Felt benefited in his hearing. Also the full and bulging sensation of the ears relieved and was comfortable. Head noises have been getting less in right ear. In left ear noises had ceased entirely. Natural secretions much more in evidence. Hearing increased in right ear one-half; in left ear double, showing a gradual improvement as the correction is going on and the normal secretions are being established.

*Case D.* Rev. J. C. F., age 62, came under treatment August 14, 1917.

*History* elicited that his hearing had been gradually failing for years. Had been examined, diagnosed and treated for catarrhal conditions in his nose. Treatment had consisted of sprays and inhalations. Valsalva's method of inflation to blow air in his ears had been frequently applied to relieve the full feeling existing in his head. Experienced dryness in back part of nose with a sensation of dripping in the throat. Head noises at times of a buzzing nature. Catarrhal condition improved under treatment, but hearing gradually grew worse.

*Examination:* Canal dry and devoid of cerumen. Drums congested and distended (convexed) handle of malleus very prominent; ossicles distorted. Tinnitus. Hearing in both ears by watch test, nil. Bone conduction (tuning fork test) increased above normal (Rinne, negative).

Artificial drums inserted, coaptating with membrani tympani; watch test: hearing improved two inches in right ear, one and one-half inches left ear.

Returned August 27, 1917. Secretions in both ears appeared to be normal. Artificial drums retained in position. Progress satisfactory. Hearing increased gradually. Tinnitus absent. Instructed to wear artificial drums for three months, then to remove them, cleanse ears and replace them, and return when necessity required.

*Case E.* A. E. A., age 58.

*History:* Could not give any cause for increased and gradual deafness. Always took best care of himself. Hard worker. Smoked cigars perhaps to excess. Very active life. General health good. Noticed some dryness of nose, seemingly of dry catarrhal nature. Frequent colds, which cleared up under ordinary care and domestic remedies. Ears began to bother, first by itching in canal. Seemed to be dry. Noises of a ringing and buzzing character, annoying and confusing. Later had to concentrate more upon what was being addressed to him. Began to realize that hearing was becoming affected. Experienced a full feeling in the head in region of the ears. Discovered that blowing his nose forcily and forcing air into his ears would relieve head noises and improve his hearing temporarily. This became more frequent. Intervals of impaired hearing more marked.

The patient came under observation August 9, 1916.

*Examination:* Mucous membrane of nose dry, glazed and raw looking. Turbinates turgescent and boggy. Accumulations of mucus of a lumpy, sticky consistency clinging to vault of pharynx. Dry, leathery condition of palate. Auditory canal was dry and scaly. Absence of secretion. Drum, dry, distended, convex and thickened in the upper segment approaching the center of drum. Handle of malleus pointing acutely outward, giving the drum the rounded appearance of a large pearl, with the ossicles out of alignment. A more vivid description is presented under Figure 2.

Treatment consisted of alkaline sprays in the nose, with retro-sprays to the palate and pharynx, followed with nebulization of oils. Ear channels were mopped out with warm solution of bicarbonate of soda and dried thoroughly. Applications over the canal and drums of Russian oil. Artificial drums inserted and brought in contact with natural drum; very gentle pressure being made to sustain the natural drum and act as a buffer to prevent further stretching and distension, while nebulization was being instituted to medicate the Eustachian tubes and tympanic cavity to overcome the vacuum.

Results were very satisfactory and pleasing. Tension relieved, tinnitus reduced, hearing increased; perception more acute. Spraying and nebulization continued three days apart. Observed each time that the artificial drum was in coaptation with the natural drum. Subsequently, it was arranged that he return at such times when the effect of the treatment began to wane. Hence as he improved his visits were less and less frequent, until now they are at intervals of two months apart, and only to adjust the artificial drums, which he could well do, but prefers that I do it for him. The status of his condition to-day is satisfactory to him and gratifying to me; so much so, that four other cases similar to this have

been sent to me by this grateful patient.

*Case F.* H. J. B., age 58 years, superintendent engineer, came to my office June 1, 1917.

*History:* Impaired hearing in both ears. Right ear more impaired than left. He stated that his men were compelled to shout to make him hear. His position was being threatened. Had had treatment at different times for impaired hearing in his right ear and for a discharging left ear.

*Examination* revealed right ear distended as described under Article 2, Illustrations Nos. 2 and 3. Left ear, complete destruction of drum and ossicles as described in Article 6, Illustration No. 14.

Hearing in right ear was practically nil, and he had not depended on it for some time. Left ear: could hear watch tick on contact.

*Treatment:* After proper cleansing of the left ear, the artificial drum was inserted and on testing the patient could hear watch tick four inches away.

The artificial drum was inserted in right ear, and he could hear conversation in an ordinary tone two feet away, with left ear entirely closed.

Patient has been visiting me at irregular intervals from three days to four weeks apart. Each time testing of his hearing showed progress towards a correction in his right ear, and improved hearing in both ears to such an extent that the remaining impairment of hearing is hardly noticeable.

*Case G.* W. E. S., age 40, a boilermaker, came under treatment June 12, 1917, with all the symptoms of boilermaker's deafness. Thickening and slight distension of both ear drums.

The insertion of the artificial drums improved his hearing fifty per cent and on his return home, as he afterward told me, upon entering the hall, heard the clock striking, something he had not heard for ten years. I might add that if the phones had been worn as a buffer, as explained in Article 2, Illustrations Nos. 4 and 5, deafness could have been averted.

*Case H.* W. S. G., age 57, Disct. Manager, Life Insurance Company. First visit occurred April 15, 1917. He gave a history in detail of having been treated for catarrhal deafness by inflation, politzerization with catheter. General condition, good. Exemplary and temperate habits.

*Examination* of the ears revealed an inferior angular eversion of both drums. Hearing tested with watch: Right ear, one inch; left ear, one inch. On April 18, 1917, artificial drums were inserted immediately after forcible inflation, resulting in immediately improved hearing: right ear, four inches; left ear, five inches. Drums retained in position.

Returned August 2, 1917. Hearing in the right ear, fourteen inches; left ear, eight inches, after placing fresh drums.

Note the immediate results and the gradual improvement.

*Case 20.* C. S. E., age 38 years; salesman. History very similar to that of the preceding case. Called October 18, 1917.

*Diagnosis:* Inferior, angular eversion.

Tested hearing; watch test: right ear, four inches; left ear, four inches. Drums inserted after forcible inflation.

*Results:* Right ear, increased to twelve inches; left ear, increased to eight inches.

722-724 Perry Building.

## DEPARTMENT OF MEDICO-MILITARY ACTIVITIES.

### SECTION OF SURGERY OF THE HEAD.

The medical care of one million troops in the field will require the services of several thousand physicians. The Medical Corps of the Regular Army, one of the most carefully selected organizations of medical men, was not sufficient for the present emergency. Primarily, the corps was augmented numerically by the organization of the Medical Reserve Corps. By a careful distribution of the men of the regular corps, the influence of their long and thorough training permeated the new organization, forming a completed organization in which those inexperienced in military medicine were safely supported. The Medical Reserve Corps organized, the profession realized its responsibility and, in consequence, commissions were issued to a large number of physicians throughout the country.

Many of the members of the Medical Reserve Corps were detailed to various Medical Officers' Training Camps for the purpose of intensive technical and physical training. This assignment afforded the officers opportunity to obtain physical fitness and sufficient military experience to qualify them as regimental, ambulance and sanitary officers. It also permitted the weeding out of the physically unfit, but did not afford opportunity to classify officers according to their professional attainments. The details of this training so consumed the time of instructors and students that it was impossible to judge of the fitness of the officers for special work.

Recognizing the need for specialists, the Surgeon General, with the General Medical Board of the Council of National Defense, through the great medical bodies of the country, established in his office sections for the care of the various medical and surgical specialties. Physicians of high professional rank, many of them authorities in their chosen field, and in civil life acknowledged leaders, were selected to direct these sections. This plan of classifying the personnel of the military medical corps, a new departure, is another example of the far-sighted preparation now so conspicuous in every branch of the service.

The various needs of the service demanded the establishment of eight sections; namely, Internal Medicine, General Surgery, Orthopedic Surgery, Venereal, Skin and G. U. Surgery, Surgery of the Head, Laboratories and Infectious Diseases, Neurology, Psychiatry and Psychology and Roentgenology.

The Section of Surgery of the Head, made up of the sub-sections of Ophthalmology, Oto-Laryngology, Plastic and Oral, and Brain Surgery, developed from a similar organization of the General Medical Board of the Council of National Defense.

In the office of the Surgeon General, the section as a whole is under the direction of a Lieutenant-Colonel of the regular corps and to each sub-section is assigned a member of the Medical Reserve Corps. These officers act in an advisory capacity in the selection of personnel, etc., and outline the policies under which the work is to be carried on.

Those in charge of Ophthalmology and Oto-Laryngology found their chief function in acquainting the physicians of the country with the fact that the Surgeon General was desirous of using the specialist as far as

possible in his specialty, and in listing the names of the physicians who came into the Medical Reserve Corps with a view to work in their specialty. They have aided the Surgeon General to select and assign the proper personnel to the Base Hospitals at the various Cantonments. At the present moment the selection of the personnel for the Base Hospitals, which are destined eventually for duty abroad, engages their attention.

The officers in charge of the sub-section of Plastic and Oral, and Brain Surgery were confronted with the fact of the great scarcity of surgeons familiar with the special technique so necessary in the successful management of injuries of the face and head. It was necessary to use this small group of qualified surgeons to instruct others, and thereby build up a corps of sufficient size to enable assignment of specially trained surgeons to the various hospitals. A conference of the recognized authorities held in Washington, developed the fact that the large universities were willing to assist in this professional training by tendering to the Surgeon General the facilities of their medical departments and hospitals.

Schools, with teaching staffs of surgeons versed in the details of special branches were established. The course of instruction includes anatomy, physiology, symptomatology, operative exercises on the cadaver and animals, splint making, clinical demonstrations and didactic lectures.

In the selection of students, the sub-section of Plastic and Oral Surgery first considered a group of surgeons commanding excellent technique, but lacking in the necessary special refinements. Secondly, the members of the dental profession, many having medical degrees, who have concentrated their studies upon peri-dental tissues, the jawbones, and structures of the mouth, and consequently familiar with the special details of the treatment. The correlation of the technique so as to enable the individual surgeons to command the combined knowledge can well be accomplished in these courses.

In a like manner the successful neurological surgeon must, in addition to his general surgical training, have some knowledge of neurology and be trained in the special technique of surgery of the nervous system. The imparting of this special training could best be accomplished by similar schools. With the assistance of the leading members of the profession throughout the country a list of candidates for these schools has been compiled. These candidates, in groups of twenty-five, are assigned to the schools for a period of intensive fundamental training. When this course is completed, it is planned to give the more competent surgeons an opportunity to continue studies in the various clinical centers of the country. Selected groups of these officers, well-grounded in the fundamentals, can later be more specially qualified through a course of clinical instruction at the front.

In this manner the important period of preparation so necessary for the accomplishment of rapid expansion of all branches of the service, will be most wisely used.

When the troops are engaged and many beds of the various hospitals are occupied by soldiers with injuries of the head, assignment of these surgeons who have had special training, to assume the responsibility of these cases should result in the utmost efficiency. In the unit for Plastic and Oral Surgery a general surgeon will have associated with him a dental oral surgeon, who, having gone through a course of intensive train-

ing, will be fitted to obtain the very best results through their correlated skill. Likewise, the officer of the sub-section of Brain Surgery, necessarily somewhat divorced from the competent neurologist, will have keen judgment and undertake with clearness his responsibility.

The fact is evident that it is not the intention of the Surgeon General to make special surgeons by means of a short course of instruction, but add the necessary special knowledge to the equipment of surgeons. This special knowledge will not interfere with the general usefulness of the surgeon in the performance of any duty which may fall upon him as a member of the military medical corps.

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## SCHOOL FOR MEDICAL OFFICERS ESTABLISHED IN ST. LOUIS.*

The Surgeon General and his advisors have, after mature consideration, decided to establish schools for the training of medical officers in certain of the specialties. In consideration of the fact that wounds of the head and neck are, because of the present mode of warfare, more than ordinarily frequent in this war, and also because the number of men who make such surgery a specialty in private practice is rather small, the surgery of the head and neck is the first of the specialties to be taught in these schools.

Major V. P. Blair, of St. Louis, who is one of the five men constituting the National Army Board in Head and Neck Surgery at Washington, has been instrumental in having one of these special training schools established in St. Louis, and one class has already been put through. It is called the Officers' School of Oral and Plastic Surgery.

Washington University very kindly furnishes, free of all cost, the use of her splendid laboratories. The faculty is drawn from the professors and instructors in Washington University and in St. Louis University.

We understand it is the intention of the Surgeon General to establish units composed of both medical and dental officers, who will care for all head injuries not involving the brain or cord; hence the officers attending this school are assigned from both medical and dental sections and receive instruction together in order that they may more intelligently work together later on.

Major V. P. Blair has general Supervision of the work for the Surgeon General. Professor R. J. Terry, Chief of the Department of Anatomy at Washington University, is Dean of the new school, and Professor H. W. Loeb, Dean of the Medical School at St. Louis University, is in charge of the curriculum.

Each "course" covers a period of three weeks. A class consists of about forty men equally drawn from medicine and dentistry. The kind of medical man most desired is the general surgeon who has shown some special aptitude or preference for the kind of work, although those who have been engaged in the head specialties are accepted, while among the dentists those showing a fondness for oral surgery and prosthetic dentistry, are more desirable.

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* Contributed by Dr. W. T. Coughlin at the request of Major V. P. Blair.

Below is a synopsis of the course just finished:

ANATOMY.

a. Dissection (Surgeons). 40 hours. R. J. Terry.

b. Demonstrations (Dentists). 12 hours. D. M. Schoemaker.

c. Surgical Anatomy. 3 hours. P. Y. Tupper.

INFECTIOUS PROCESSES ABOUT THE MOUTH, FACE AND NECK.

a. Peridental Infection. 2 hours. Virgil Loeb.

b. Infections of Soft Tissues and Bones. 2 hours. Ernest Sachs.

c. Infections of the Maxillary Antrum. 1 hour. H. W. Loeb.

d. Bacteriology of the Mouth. 4 hours. E. P. Brady.

e. Salivary Infections and Fistula. 1 hour. Carroll Smith.

WOUNDS AND OTHER INJURIES.

2 hours. J. Rilus Eastman and Ernest Sachs.

FRACTURES.

Diagnosis and Treatment of Recent and Old Fractures. 4 hours. Captain H. Ivy.

SPLINTS; MAKING AND APPLICATION OF SPECIAL FORMS.

a. Dentists, 30 hours. W. F. Neuhoff.

b. Surgeons. 4 hours, in groups. J. H. Kennerly, B. Lischer, F. C. Rodgers, Virgil Loeb, Walter M. Bartlett, H. C. Pollock.

OPERATIVE COURSE.

a. Plastic Methods on the Cadaver. Lectures, 5 hours; laboratory, 15 hours. W. T. Coughlin, Meyer Wiener.

b. Blood Transfusion and Bone Grafting. Lecture, 1 hour; laboratory, 6 hours. Barney Brooks.

ANESTHESIA.

2 hours. Ellis Fischel. 2 hours. E. H. Keys.

POST-OPERATIVE CARE.

a. Ward Work. 3 hours. A. O. Fisher and O. R. Sevin.

b. Mechanico-Therapeusis. 1 hour. F. W. Ewerhardt.

ROENTGENOLOGY.

2 hours. Captain H. Ivy, Sherwood Moore.

CLINICAL DEMONSTRATIONS.

12 hours. W. T. Coughlin, A. O. Fisher, Ellis Fischel, John Kennerly, Virgil Loeb, Ernest Sachs.

EXTRACTION OF TEETH.

4 hours. G. B. Winter.

P. S.—Since writing the above, we learn that the course is to be lengthened to five weeks and instruction is to be given in the surgery of the brain.

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Dr. John F. Culp, Harrisburg, Pa., has been commissioned a major in the Army Medical Corps.

Dr. R. H. Ells, Ottawa, Canada, is in France.

Dr. A. D. McConachie, Baltimore, has been commissioned a captain in the Army Medical Corps and has been assigned to active duty at Plattsburg Barracks, N. Y.

Dr. J. W. Caldwell, Nashville, Tenn., has been ordered to Fort Oglethorpe, Ga.

Dr. Duncan MacPherson has received a commission in the Army Medical Corps.

Major A. C. Magruder, Colorado Springs, is at Fort Sill, Oklahoma.

# SOCIETY PROCEEDINGS.

AMERICAN LARYNGOLOGICAL ASSOCIATION.

*(Continued from page 788.)*

DISCUSSION.

DR. JAMES E. LOGAN, Kansas City: There is no question in my mind but that sinusitis results in atrophy—that is, the cases are usually pre-existing sinusitis cases.

DR. ROBERT C. MYLES, New York City: I have never been able to find anyone who had seen a case which occurred after puberty—that is, anyone in authority. It is essentially a disease of child life. How much of it is retarded development and how much atrophic is another question. The most serious question is, how should we operate on the sinuses of these children; what is the best procedu: ° That can be developed in the future, I think. In regard to patients who are older, it has been my experience that at any age I get my most brilliant results, with regard to odor and continuance of discharge by opening the antrum.

DR. J. M. INGERSOLL, Cleveland: I simply wish to ask Dr. Coffin whether these patients were operated upon endonasally or through the canine fossa, and what results were obtained?

It seems to me that we should not consider here the question of atrophic rhinitis. If this is to be a discussion on the origin of atrophic rhinitis, may I ask how it is that the orbital fissure from the anterior half atrophies also in the process? There is no sinus opening into that district.

DR. HENRY L. SWAIN, New Haven: Dr. Coffin has come to us with the most astounding assertions. I understand he has come with the proposition stating that he thinks he has further evidence of the origin of atrophic rhinitis in children. Then he comes forward with the statement that he thinks he can cure odor by opening up the antrum, and in his remarks he presupposes that these diseased antra began in childhood, produces atrophic rhinitis, and continues through years of life. Then he states he cures atrophic rhinitis of at least the odor by opening up the antra. I think those are rather bald statements and would like to hear them commented upon. Personally, I have examined his statements and believe he is right.

DR. J. L. GOODALE, Boston: Dr. Coffin will have an opportunity for further elaboration of that point. It is in order for any member to ask questions regarding further information from Dr. Coffin.

DR. HANAU W. LOEB, St. Louis: This so-called purulent rhinitis which was described so well twenty-five years ago or so is exceedingly common, and from the fact that the nasal mucosa is affected, it is easy to understand that any of the sinuses more directly connected with the nose in childhood than in adult life should be similarly affected. If the mucosa of the antra is thickened in an existing case of suppurative rhinitis, it is very natural that it should show on the screen. That explains, to my

mind, the reason that in so many of these cases Dr. Coffin was able to find evidence of obscuration of the antral fistula. However, this is an exceedingly common condition, and as atrophic rhinitis is fairly uncommon, he should explain why it is that so many get well without the production of atrophic rhinitis.

Dr. Burt R. Shurly, Detroit: I should like to ask Dr. Coffin how extensive is the operative procedure following this particular line of invasion.

Dr. Norval Pierce, Chicago: I am sure that some of these pictures are misleading. Last winter I had two cases—children ranging from four to six years—where the roentgenologic picture, according to the readings of the roentgenologist and myself, showed anterior disease—in one case bilateral, and in the other case lateral. I washed out three of these antra (in one case I washed it twice), and nothing whatever was washed out. They were quite dry antra. There is no doubt but what they were dry. In the past I have had a similar experience to that, where the discharge from the nose led me to have an ex-ray taken, and where the roentgenologist said that the sinuses were undoubtedly diseased, but which were found healthy. So that we must check up these cases of supposed disease of the sinuses by other means than the x-ray.

Dr. Robert C. Lynch, New Orleans: Down South we see a number of cases of atrophic rhinitis, and I have two children of the same family, twins, two and a half years old, perfectly well developed cases of atrophic rhinitis. I wonder whether they have lived long enough to go through the period of inflammatory changes to give them atrophy. I do not think they are due to simple sinus disease.

Dr. J. M. Ingersoll, Cleveland (closing the discussion): We get new ideas in regard to the anatomic relations from the stereoscopic pictures, because we get the three dimensions. In regard to the use of stereoscopic radiographs, I think that unless a man uses them long enough to become familiar with them, and develops some skill in interpreting them, they are liable to stop using the method. If they do study them and check up the findings, I am sure they will become convinced of their value.

Dr. Loeb spoke of the value of reversing the plate. One of the great advantages of the stereoscopic plate is that you can look at it from both sides—that is, you see the structures in the operative field, and also from the inside, which you cannot see in any other way.

Shadows over the accessory cavities in the x-ray, whether stereoscopic or other plates, make one suspicious of involvement of the sinuses of the nose. I regard them simply as one of the confirmatory evidences. They are not positive. There are other things which enter into the causation of the shadows. A sinus which has thickened mucous membrane casts a darker shadow than one with a normal mucous membrane. The variations of the bone structures themselves, or part of the other bones beyond coming into the field, make one sinus appear darker than another. The bones do vary, so that a dark sinus alone, as seen in the plate, should make one only suspicious of that cavity.

Dr. Lewis A. Coffin, New York City (closing the discussion): Every case of atrophic rhinitis generally brings out something like adenoids and tonsils. Inasmuch as this is so, and that Dr. Loeb stated that it is not a very common or rare disease, I will convince him at least that it

is as common as this. If you go in the hospital ward you will find almost all the children show disease of this kind. This does not mean that if you will take them off the street they will show the same percentage. They are simply diseased children.

I had a little patient in the same ward four or five years ago, and she is now ten or eleven years old. She had a keratitis, and had been in the hospital a year. We took out one tooth, both the milk tooth and the one above it, and cleaned up the antrum, and inside of a short time her eyes were open and they have been open ever since. I saw the child and examined her jaw, and one would not know she had even lost a tooth unless you counted the teeth on the two sides.

Somebody asked the question as to whether these all went on to atrophic rhinitis. I presume not. Some get well; but all the cases shown here are chronic cases.

There are changes in the lining membranes of sinuses that the microscope and pathologists cannot tell us. There are latent sinusitis cases in which the x-ray does not show much. I have operated upon a case and found no free pus and no pockets of pus, but every bit of tissue taken away the pathologists will tell you is just covered with disease. I think it is possible to get some of our worst conditions from latent sinusitis cases. The antrum frequently shows dark under the x-ray; you cannot even get water through, and yet there is no pus. I do not know what the degeneration of that membrane is, but it is full of polyps.

In regard to opening up the antrum and getting rid of the odor, because it is just as easy to do this in atrophic cases, go home and try it.

We had one case in which the odor was as bad as you can think of, and the patient had never been treated for ozena, and nothing had been done but the antrum opened. In some of the cases we purposely left the ethmoids to pustulate and scab, in order to see the scabs without the odor, but the antrum is clear.

**The Intranasal Drainage of the Frontal Sinus.** By E. FLETCHER INGALS, M. D., Chicago.

The writer believes that in a large majority of cases of chronic frontal sinus disease, free drainage is all that is necessary, and that vigorous curettage is a bad practice, although gentle removal of polypi or granulation tissue with a curette, if present, would undoubtedly hasten the cure.

The furor for extensive mutilating operation on the frontal sinus has had its day, and now, more conservative intranasal drainage is a practice that is generally accepted.

The writer's attention was first called to the benefit obtained from intranasal treatment in 1893, when he succeeded in curing two cases by intranasal treatment, as neither of them would consent to an external operation.

As drainage into the nose was a prerequisite for treatment, the writer devised a burr with a safety guide to be run into the nasofrontal duct so that the duct could be enlarged permanently.

This burr made a canal six millimeters in diameter, which, however, had a tendency to contract. To prevent this latter, a metal tube was inserted into the canal. This metal tube was superseded by the spring-gold self-retaining tube now in use. This may be worn for a number of years and permits free irrigation by the patient.

The writer is convinced that the operation can readily be performed by any properly equipped laryngologist, and has placed the percentage of recovery of suitable cases as high as ninety-five per cent.

The instruments used are described, as also a detailed account of the manner of operating that the speaker has devised.

**Further Report on the Intranasal Treatment of Accessory Sinus Diseases.**

By ROBERT CUNNINGHAM MYLES, M. D., New York.

In the past twenty-four years the writer has had much to say concerning the intranasal treatment of accessory sinus diseases. On the fourth Wednesday in January, 1893, twenty-four years ago, he read a paper entitled, "The Diagnosis of the Diseases of the Accessory Sinuses and Their Treatment."

On account of the failure to secure uniformly good results, in antral suppuration, he made use of the malar ridge and canine fossa route; and then, after due consideration had been given to the cases, with more or less unsatisfactory results, it was noted that very favorable conditions nearly always followed when the window through the inferior nasomeatal wall was not less than fifteen millimeters in diameter, and never contracted to less than about ten millimeters.

The writer continues to prefer the nasal route to the antral one for operation on the sphenoidal cells, and strongly advocates making large openings in the anterior walls.

Partial success in an attempted submucous and subperiosteal operation on the anterior wall previous to removal of the bony wall, and the utilization of the membranes for covering the lower sections of severed bone, encourages the belief that if this procedure is well carried out it will aid materially in preventing the too frequent closure of the sphenoidal openings.

In the ethmoidal cases the classical operations of removal of the middle turbinal, the floors and the median walls of the cells are carried out.

The progress that has been made in the intranasal treatment of the frontal sinus diseases centers around the methods for making permanent large openings from the nose into the sinuses.

After removal of the anterior end of the middle turbinal and the anterior ethmoidal cells, the writer uses improved designs of his outward cutting chisels for removing as much as is possible of that part of the floor of the sinus which is formed by the nasal process of the superior maxillary bone. These instruments are used with a feeling of safety, as they automatically protect the dangerous areas in this region. Several of the most useful models are presented with this paper for your inspection.

DISCUSSION.

DR. EMIL MAYER, New York City: I would like to make an apology for the abstract editor, and would like to say that what Dr. Ingals complains of was not any garbling of any original paper, but a misstatement on the part of the stenographer of the discussion, which was very voluminous, on the symposium. The original statement of the stenographer as to Dr. Ingals' standpoint was quite in accord with what he says to-day. The trouble lay in an attempt, within one hundred and fifty words, to make a description of an operation which omitted some quite vital and important things. I will say this, that I question whether any laryngol-

ogist would take an abstracted report in any journal and would attempt to follow any method or description of any operation. He would surely go to the writer of the paper or to the Transactions of the Association, so as to get the correct report. However, all bad things, and this certainly was bad, as Dr. Ingals and I and the rest of you also will agree, have their good ends, and the good end lies in that we have again the pleasure of hearing from Dr. Ingals just how this intranasal operation is done, and how, after ten years, he finds that the operation is still one that he can recommend to us. So, if you will forgive the abstract editor in part and the stenographer in whole, I think you will agree with me that something has nevertheless been gained.

Dr. Joseph H. Bryan, Washington: I have been able to open up the frontal sinus in the living subject, too, but not in all cases. After having gone over the anatomic relations in the cadaver so many times, I have found out that a great many irregularities exist in the accessory sinuses, particularly in regard to the frontal in relation to the ethmoid, and it makes me hesitate when I hear this procedure, so ardently recommended as it has been by Dr. Ingals. There must be some difference in the cases that we have been having. I am quite sure that no such method as the doctor recommends can possibly cure such cases as I have had. Now, I have never yet operated on an acute catarrhal or an acute suppurative inflammation of the frontal sinus. I have had considerable experience in this line. All of my cases have been of a severe form of chronic inflammation, lasting a number of years. After going over his papers time and time again, and trying to bring myself to believe that I could follow out the same line of procedure, I have been timid and have gone to the external method, and whenever I have one of these cases I have come to the conclusion that such an operation is not possible to relieve such cases. Now, is it possible in a frontal sinus, with a prolongation extending far into the frontal bone and extending back into the floor of the orbit and into the external angle, by more drainage to cure a case of that kind? Now, in these chronic cases there is nearly always caries of the frontal region, and it is not possible to cut the bone out or cure the condition by simple drainage, which this method is directed to, as I understand it.

In his hands, undoubtedly, the entering of the frontal sinus is practically an easy method, but is it a safe method or an easy method for the average rhinologist? While sometimes it may be very simple for those who are practiced in doing this kind of work, nevertheless, a man must always bear in mind that he cannot know what there is inside of that sinus without doing the external operation.

Dr. Henry L. Swain, New Haven: There are a great many cases where we refuse or hesitate to make an external operation. We are not all as successful as Dr. Bryan in having our operations clean up. Certainly, I think there is a vast field for the procedures of Dr. Ingals in the medium cases, and in the severe cases we will bow to Dr. Bryan. I have had some severe cases, but a lot of cases we could get well by the internal method. This is safe and sane. Dr. Ingals has proposed one to us. I must say I have not done it. I am like Dr. Bryan, afraid to do it, from my knowledge of it from his description alone, even though it is profusely illustrated. I seem to get along with milder means than even Dr. Ingals suggests, but I do get the cases well, and do not have to do the external operation only very rarely.

I have had this winter three cases which anybody would suppose ought to require external operation, where there have been spontaneous external perforations into the orbital cavity, and one where the diseases went through the front plate of the frontal sinus on to the forehead. Presumably the process was severe enough to make the bone necrotic. All three got well simply by ordinary curettement of the frontal nasal duct and opening the abscess in the orbit. The bone of the external plate was not touched in any way at all. I have simply had good luck, but it shows the possibilities—that sometimes cases seem severe and yet do not require severe measures. There are three classes of cases—the ones that get well by simple curettement; those that require simple intranasal methods; and occasionally a case that requires the external method.

DR. HANAU W. LOEB, St. Louis: I just want to mention a procedure which Halle published in the past two years, which makes all these external operations much easier, and that is to make a flap of the mucous membrane covering the superior maxilla anterior to the middle turbinate. It takes away that thickness of the wall and also permits much more ready access to the frontal sinus.

DR. GORGE E. SHAMBAUGH, Chicago: The more I see of chronic accessory sinus infection, the more I become convinced that intranasal surgery is the proper treatment for the vast majority of the cases. Most of the cases can be cured by this method, and those which are not completely cured are with very few exceptions, relieved of all symptoms which would justify an external operation.

In the case of the maxillary sinus I have found that by working through the nasal fontanelle in the middle meatus one can in a few seconds' time, with suitable instruments, secure an opening one-half by three-quarter inch long and one-half inch broad, which is ample for our purpose. This can be done with local anesthesia with much less shock to the individual than an opening in the inferior meatus. The old idea that an opening in the inferior meatus had an advantage because of its location near the floor of the sinus, does not hold true, thus securing ventilation of the sinus. No irrigation afterward is required.

The frontal sinus is considerably more difficult ofttimes to secure a sufficiently large intranasal opening to permit of free ventilation of the frontal sinus, and for this reason we are able less often by intranasal surgery to bring about a complete cure of chronic frontal sinuitis; but it is the rarest exception for us to find a frontal sinus infection where anything more than intranasal surgery is justified. It has been my belief for a long time that the external operation for the frontal sinus should be a tabooed operation except in the rare cases where, in spite of painstaking, careful intracranial surgery, severe symptoms persist, indicating retention and pressure and threatening intracranial complications.

DR. GREENFIELD SLUDER, St. Louis: I think that when Dr. Bryan takes the stand that there are cases with a ramification of the frontal sinus under the roof of the orbit, out into the external cochlear process of the frontal bone, when it runs back to the lesser wings of the sphenoid and extending more or less swollen beyond with granulation tissue, that case will in all probability not get on by simple drainage. Dr. Roe, if I remember correctly, in 1890, stated that he had deliberately left the antrum in one case filled with granulation tissue, prevented internal

drain and left the granulation tissue alone, and that the case healed. Some five or six years ago I was in a frontal sinus externally, and found it not specifically enlarged or ramified, but filled with granulation tissue. The case had been operated by someone else before, and the naso-frontal outlet was blocked in solid bone. There was great headache, and the bone was so healed that it could not be handled from within, so I went into it externally and found the cavity filled with granulation tissue, but put a drain into the nose and that was satisfactory. I left the cavity filled with granulation tissue and that case healed.

I believe that the value of a satisfactory drain for all of these, whether they be frontal, ethmoidal, antral or sphenoidal, cannot be possibly too greatly exaggerated, but there must still remain a case that requires Dr. Bryan's procedure, that must of necessity justify his ideas concerning these cases. It is difficult to tell how far it really can go. In 1890 I had an antrum that had been suppurating four to five years. The operation that was done was the old Cowper through the alveolar. I kept it open with a plug, I washed it, and in some six months it stopped suppurating. It was always reinforced by coryza and healed with a few washings. The old gentleman died a few years ago. After I learned the intranasal procedure, I offered him that and explained that it was a better procedure and would relieve him of his trouble and his plug, but he declined to accept it.

DR. E. FLETCHER INGALS, Chicago (closing the discussion): Dr. Bryan thinks that if one cannot get into the frontal sinus, it cannot be operated on. This is quite right. However, I have been able to pass the probe into the sinus in ninety-five per cent of all chronic cases, but in about ten per cent I was not able to get it in the whole distance at first; then I ran a burr up perhaps three-eighths of an inch, after which the probe passed easily into the sinus and the operation was completed. You notice that these probes are of different sizes and curves. If a probe will not go in with one curve, make another one; if a large one, one and one-half millimeters, will not go in, take one that is one millimeter in diameter. If one can do the operation, possibly in five per cent of the cases an external operation may be desirable later on. I would not claim this as a cure-all by any means. The question as to whether drainage is sufficient to cure these cases or not is one that we have to determine by experience. Experience seems to show that it is sufficient in most cases, even if there are granulations. It seems to me that scraping out all of the mucous membrane in the sinus is absolutely bad practice.

I do not recall any chronic case in which I have attempted to probe the frontal sinus in which I have not succeeded—at least, after I have run the drill in for perhaps three-eighths of an inch; but I will admit that it has occasionally taken me as much as an hour to do it. But if I can get the probe in once, the next time that I put it in I can make a large opening very easily.

I believe that practically all of the cases will heal if we give them drainage, and I think that most of you will believe this.

DR. ROBERT C. MYLES, New York City (closing the discussion): If you are going to obliterate, you have to obliterate completely; but if you leave one small piece of mucous membrane in the sinus, you will have trouble. Patients are coming to me all the time from the general sur-

geons with imperfect drainage. If you will notice, in my paper I mentioned the fact that they opened the sinuses and left them with a so-called polypoid condition; they simply packed them. The reason of that is that these are not granulations, but an edematous condition called granulations. They will disappear; the condition is the same as the watery eye or the postorbital eye. It is a circulatory condition and not a pathologic one. I admit, of course, that granulation sometimes comes from diseased periosteum.

But fundamentally, the crucial point in all of these cases is to get it open and maintain it open and keep it open; and the results in this way are better so far. I believe that five or ten per cent of these cases have come to external operation, but we are now able to cure a large percentage of them by the internal method. The question of the necessity of distinction enters. I have lots of cases which heretofore I would have determined to require the external operation, which are now operated by the internal procedure.

**Vincent's Angina.** By THOMAS HUBBARD, M. D., Toledo.

(Published in the present issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. EMIL MAYER, New York City: I would take some exception to the originality of the use of glycerin of iodin. When I first called attention to this infection we know so well now, I then spoke of the use of iodin, iodid of potassium, and glycerin as a local application. I have since learned to know the tremendously valuable effect of the salve, either injected intravenously or applied locally.

A very short while ago a patient presented himself at the Mt. Sinai Hospital, New York City, with a very large ulceration at the under surface of the tongue that had been existing for a couple of months and due to the bacillus Vincent. A local application of the salvarsan with an intravenous injection, the Wassermann having first been proven negative, resulted in a cure within forty-eight hours. I would like, however, to see some of the results from the application of the salvarsan locally, without the intravenous injection. It is very possible, indeed that the application itself would do all that we would require, and the patient might not even require an injection; but it does not mean by any means that because a patient has recovered that that patient has had syphilis, but that this arsenical preparation has a beneficial effect on the treatment and cure of this disease.

DR. THOMAS HALSTED, Syracuse: About a year ago a physician consulted me, with the statement that for six weeks he had had a severe tonsillitis. He had contracted this, apparently, from dancing one evening with a school teacher, who had at the time a sore throat, which was diagnosed the next day as diphtheria. She died in the course of ten days from Vincent's angina. This doctor developed within a short time an ulcerative sore throat. He was seen by a number of specialists, but the diagnosis was not made, and he finally came to me. I found an extensive and deep ulceration of both tonsils and a marked cervical adenitis. The ulceration was soon proven to be Vincent's angina microscopically. A short time before this my attention had been called by a general practitioner to the possible use of enesol in the treatment of

Vincent's angina. Enesol is a French preparation of arsenate of mercury. We used enesol hypodermically and did nothing else. There was no local treatment whatever. The improvement was marked, and at the end of six days, during which time three treatments were given, the ulceration was perfectly healed. Since this case I have treated not less than six or eight cases of Vincent's angina with enesol, and all of them with most satisfactory and rapid improvement. I think enesol is a specific for Vincent's angina, and preferable to salvarsan, because of the greater safety and simplicity of the treatment.

DR. THOMAS HUBBARD, Toledo: I am very glad that Dr. Mayer mentioned the use of iodin.

This formula is iodid of zinc, iodin, glycerin. Whether it is more penetrating than the ordinary iodin glycerin preparations, I do not know.

As to the choice of the arsenical preparations, I think that is a question of clinical proof; Dr. Halsted's report only goes to show that the use of some member of the arsenical group is a dependable treatment of Vincent's angina type of infection.

**General Streptococcic Infection Through the Accessory Sinuses and the Tonsil.** By T. H. HALSTED, M. D., Syracuse.

Chronic suppurations in the sinuses are by no means local diseases in the sense that their effects are confined to these organs.

It is the chronic infections, the staphylococcic, pneumococcic and streptococcic, that are perhaps of greatest importance, because of the insidious and slow degeneration which their absorption produces in the whole system. In these which are so commonly overlooked and their true significance so little appreciated by both specialists and the general practitioner.

Of equal and perhaps greater importance than local infections of the nose and their adnexa, though only in degree, are the infections of the teeth and of the tonsils.

The tonsils, whether the faucial, lingual or nasopharyngeal, in a normal healthy condition, undoubtedly offer a hindrance and are a barrier to the farther ingress of pyogenic organisms to the lymph or blood stream. Conversely in a diseased and dilapidated condition, these same structures offer a habitation and afford the easiest way, becoming the open portal, for the passage beyond of the invading army of micro-organisms.

A mixed infection of the tubercle bacillus and the streptococcus is of frequent occurrence. Just as tuberculosis is conveyed from one individual to another through the inhaled sputum, and is mildly contagious, so probably is rheumatism—i. e., infectious streptococcic rheumatism.

It is a matter of constant clinical observation that with enlarged and diseased tonsils, not regarded as tubercular, enlarged cervical glands, thought to be tubercular, are often associated. The removal of such tonsils is usually followed by a reduction in the size of the enlarged glands.

Endocarditis and arthritis often supervene or follow an attack of acute tonsillitis.

Chorea is now known to be a rheumatic or streptococcic infection of the nervous system, that the improvement results because of the removal of the primary focus of infection, the tonsil and the adenoid.

In childhood, tonsillar and lymphoid tissue is most prone to acute infection, and it is at this time of life that acute inflammatory rheumatism and endocarditis, usually following an acute tonsillitis, is most likely to occur.

We shall soon be classifying a great many affections, now regarded and treated as separate entities under the general classification of streptococcic disease.

The streptococcus is transmitted from one individual to another through direct or nearly direct contact, such as in the act of coughing, sneezing, kissing, the organism being inhaled into the mouth with the mucus from the infected person, or it may enter through traumatism by means of an infected instrument, or, again, it may reach the mouth through food, particularly milk, the milk having been infected by those handling it.

As for the treatment of streptococcic infected tonsils, complete enucleation (tonsillectomy) is the rational procedure.

After the tonsils are removed the patient may still show evidence of remote or general streptococcic infection. This means simply that there still remains a focus somewhere, possibly in the adenoids. Possibly the tonsils were not completely removed, even though the operator was most careful, a small piece, no larger than a pea, remaining in the supratonsillar fossa or at the base, adjoining the lingual tonsil; and if such is the case, this fact should be recognized and dealt with by a second operation, the sooner the better. Again, an apical tooth abscess may have been overlooked or the difficulty may lie in a secondary focus in the gall bladder, the appendix, some joint, the endocardium, pleura or other localized area.

**The Susceptibility to Infection Manifested by the Remains of Incompletely Removed Tonsils.** By HANAU W. LOEB, M. D., St. Louis.

If a portion of the tonsillar lymphoid tissue is left after operation, especially if it happens to contain a crypt, it is very much inclined to persist in *statu quo*. It may never occasion any unpleasant result, but it is present nevertheless with its susceptibility to infection, reduced though it may be. What is considered an atrophied tonsil usually signifies that the tonsil tissue has become somewhat more covered by the anterior pillar and has in part simply disappeared from view.

There must be a not inconsiderable number in which tonsillar stumps remain, even in the practice of the most experienced operators, and the writer presents five cases showing infection originating in such tonsillar remains.

These cases definitely show that small masses of tonsil tissue overlooked, or at least not removed at the operation, are susceptible of infection with remote effects similar to those which follow acute tonsil infections.

They must have their counterpart in the practice of other laryngologists, and from his own experience must be common enough to constitute a fairly definite clinical entity.

They present a decisive argument against any form of operation which does not contemplate the entire removal of the tonsil, especially where there has already been some infective processes originating in the tonsil.

They suggest the advisability of following up cases of tonsillectomy to determine whether any portion remains and whether it has become a focus of infection.

DISCUSSION OF PAPERS OF DR. T. H. HALSTED AND DR. HANAU W. LOEB.

DR. GEORGE B. WOOD, Philadelphia: I desire to call especial attention

to the difficulty in recognizing when a tonsil is responsible and when it is not responsible for a given infectious condition. According to my own experience, inspection of the tonsil itself in the majority of cases side little in this determination. Small innocent-looking tonsils can give rise to severe general infections, while, on the other hand, large swollen tonsils with masses of epithelial debris in the crypts are frequently found in apparently normal individuals. Of much more value is the history of repeated attacks of tonsillitis, their relation to the general infection, and the presence of cervical adenopathy. The bacteriologic study of the contents of the crypts of the tonsil will often give important data. This study can be carried further by determining the relation of the bacteria obtained from the crypts to the blood reactions of the individual. In a person suffering from chronic tonsillar absorption for a considerable length of time, it is probable that a certain amount of immunity against these organisms has been established. If agglutination of the bacteria from the crypts or a complement fixation can be demonstrated, there would be good reason to believe that a certain amount of absorption had taken place through the tonsil. From a somewhat limited number of cases this reaction has been found in a certain number of chronic cases, though in acute tonsillar infections the immune bodies could not be demonstrated, probably becaues sufficient time had not elapsed for their formation. The importance of these reactions can only be determined by a large series of cases, preferably carried out by a number of observers.

Concerning the possibility of recurrence of tonsils after removal, I believe that a certain amount of actual recurrence can take place. In these cases the new tonsillar tissue is superficial and is found simply as small lmyphoid follicles scattered over the surface of the scar tissue. More frequent and more serious apparent recurrences are simply hyperplasias of tonsillar tissue left behind at the operation.

Dr. Burt R. Shurly, Detroit: Many people think that when their tonsils are removed they will never have another sore throat, and that is not probably explained sometimes by the man who does the operation. Again, we have certain islands of tissue that are perhaps more frequently left in place, and undoubtedly, if we take into consideration all the different operations we have done throughout the years, we will find a very considerable number of incomplete operations. On the anterior pillar itself, very frequently even when we think we have accomplished a very complete operation, we find tiny islands of tissue which can only be observed by a most thorough examination. Many times when we think we have done a most complete operation and go back over the ground again, one, two or three times, we still find some tiny islands of tissue we have left; if this happens to be on the anterior pillar, it frequently gives rise to more trouble. I do think, though, that there is great danger of exaggeration as to just how much damage results from leaving some of these tiny islands of tissue.

Dr. Thomas Hubbard, Toledo: I have in mind a throat in which there was perfect enucleation of the tonsil, and yet the patient returned several times and said that she was having recurrent attacks resembling those which she previously had. Finally, one day she returned with a distinct swelling. I was able to pass a probe into the fistulous tract, which evidently led into the muscular tissue. There was no tonsillar tissue left at

all, but showed a most thorough operation. It is probable that sometimes we leave one of the small fistulous tracts which have been part of the peritonsillar suppuration at some previous time. I would say that during these attacks she had a recurrence of the arthritic symptoms, just the same as when the attacks were due to tonsillar and peritonsillar inflammation.

DR. J. PAYSON CLARK, Boston: There is one point in Dr. Halsted's paper which I would like to emphasize, and that is the possible relation of unsuspected conditions of the teeth to general infection. I have been surprised at the number of cases in which a tooth giving no symptoms locally at all, was in very bad condition, and treatment of that tooth at once relieved the general symptoms.

I have been surprised once or twice, and several of the cases I have been able to explain, where I was perfectly positive I removed the tonsil, capsule and all, where the capsule was perfectly smooth and the fossa quite empty after operation, and a year or more afterwards there has been an appearance of tonsil on one side or on both sides. My explanation was that some of the lymphoid tissue of Waldeyer's ring in the healing process has been drawn up into the region of the tonsil. That tissue drawn up differs from ordinary tonsillar tissue in that no crypts appear in it. I have never seen any inflammatory process.

Of seventy-three cases operated at the Massachusetts General Hospital before we had begun to do the capsule operation, in sixty cases the tonsil tissue was still visible; twenty of the cases gave a history of one or two attacks of sore throat since the operation. Of those attacks only ten had been definitely determined upon to be tonsillitis; at least two-thirds of the cases of tonsillotomy had had no subsequent trouble. There were twelve cases of illness since the operation, but none of the cases of illness were of the kind to be attributed to any infection from the remains of tonsillar tissues; these cases were all children.

DR. HENRY L. SWAIN, New Haven: The fact that we do not have more knowledge of the return of tissue after enucleation, I believe is due to the fact that in lots of our cases the person is not as susceptible as are those from whom we do hear. Certain cases show marked susceptibility to inflammatory seizures. If you leave the slightest bit of tissue, you get a report of sore throrat and constitutional symptoms, etc. In other cases you can leave three times as much tissue and there is no report of any trouble whatever.

In my home town, a year ago, we had an epidemic of streptococcic sore throat, due to milk infection. In all, we had one hundred and twenty cases. I took a great deal of interest in looking into the question of the presence or absence of tonsils. Out of that group there were between twenty and thirty cases who had had thorough removal of the tonsils—absolute tonsillectomy. None of us would have been dissatisfied with the results of the operation had we done it ourselves. In these cases we sometimes got more trouble than in those in which there is a abundance of lymphoid tissue. The five cases which gave me the most trouble, with abscess formation, edema of the larynx, were in cases of complete tonsillectomy.

The probabilities of general infection such as Dr. Halsted speaks about is illustrated in a most interesting case I had recently, where the patient

had a simple sore throat and then developed general poisoning of the system from the effects of inflammation. As a result of that he had a large abscess at the back of the neck, which seemed to have a formation of membrane in it, so that one expected to find pseudodiphtheritic discharge. He was given autogenous vaccines in large doses, and it was well carried out in every particular. Six weeks after the original sore throat he came down with another sore throat, in which he had exudate over four distinct strips of tissue, both tonsils and both lateral columns of the phraynx were covered by a false membrane. Cultures from this showed to be streptococcus. He did not have a distinct sterptococcemia.

Dr. Greenfield Sluder, St. Louis: It is an interesting question all the way through, and that is the matter of peritonsillar infiltrate. The aftermath of the case, the future course of the case, frequently has been influenced by the infiltrate that was about the tonsil. That infiltrate seems to me to frequently take the part almost of the tonsil itself. I have seem them a few times, and latterly I have seen a few cases in which the infiltrate behaved as the tonsil—began with a sore throat and suppurated in both cases. The tonsil was perfectly enucleated and preserved in a bottle. I make it a practice in operating upon cases to save the tonsils from every individual, and later on I frequently find that I possess a number of tonsils and capsules which are perfect; but, as Dr. Clark has expressed it, the lymphoid tissue of the base of the tongue has grown up into the fossa and looks very much like a tonsil. The peritonsillar infiltrate may, furthermore, hypertrophy and later on look like tonsil, as if something had been left, unless very carefully inspected. With that end in view, some three months ago, in the presence of a very large infiltrate, I removed the tonsil with a guillotine and found something which looked like the tonsil still in the throat. I then took out an infiltrate, the size of the original tonsil, and the infiltrate on the opposite side remained. Subsequently sore throat developed, and developed in the infiltrate that was left. The side from which the infiltrate was removed escaped.

Dr. Harmon Smith, New York City: I believe that nature requires a certain amount of lymphoid tissue in that region, and, just as we see when we remove the soft palate for malignancy, the posterior tips of the turbinate hypertrophy to prevent regurgitation of food in the pharynx, so the remaining lymphoid tissue undertakes to carry on that element of protection which the tonsils previously did. I do not believe that spontaneously tissue resembling the original tissue will spring up. I know of instances in which, three or four times after the removal of the tonsils, from childhood on up to puberty, where each time every microscopic evidence had been removed, yet there still recurred certain islands of lymphoid tissue, and around the islands there was formed a certain kind of capsule.

If you remove tonsils and leave lymphoid tissue at the base of the tongue, in such infections as from milk, etc., the lymphoid tissue at the base of the tongue will produce tonsillitis just the same as the original tonsil.

Dr. Joseph Goodale, Boston: In certain children who may have tonsils and adenoids removed by operation we may have a condition of partially developed anaphylaxis. It is not a true vasometer rhinitis, but a condi-

tion of snuffing, blocking of the nose, and the symptoms which appear are those of a tendency to taking cold. There may be possibly a portion of tonsils left, but what we should do is to look somewhat further than the throat. We should see if the child is taking more milk than it is accustomed to in the summer, or an extra cup of cocoa, or an extra egg; it seems to me, before we should proceed to a further operation on that throat that we should examine very carefully this question of diet. I would suggest that any of this unusual food should be diminished and restricted, and I am sure you will find that a certain percentage of these cases will lose their symptoms. They will freely disappear without another operation, or loss in weight, but a gain in weight.

DR. HAHAU W. LOEB, St. Louis (closing the discussion): I have spoken of the actual leaving of portions of the tonsil in some instances by myself, and in some instances by other operators. I am sure that if operators will examine their cases, one, two and three months after operation, they will find not infrequently that a small mass of tonsillar tissue remains. It so happens that in two instances I was able to verify the fact that I had left a portion of the tonsillar tissue there, because I had the tonsil in a bottle, and a careful examination of the capsule revealed where a very minute portion had been omitted.

With reference to the inclusion of some tonsil tissue in the scar, I feel, at least in one particular case I reported, that the inclusion was there before the scar; in other words, I left a mass there and the scar covered it over. This was the case in which there was a minute abscess in a little crypt. This patient had several attacks of appendicitis, which went on to operation, and I feel the little piece I left there may have been responsible.

We should not hesitate to let our patients know when we have performed an incomplete operation. This is better than having an acute infection come on and someone else tell the patient. I do think we ought to protect ourselves in that respect. I, for one, never hesitate to tell the father or mother of a child that I have left a small portion of the tonsil. Of course, years ago that was fairly common, but I am thankful to say it is uncommon now.

I wanted to bring the matter up to the association, not as an argument for tonsillectomy, but for complete tonsillectomy, and also to assert that the mere statement that an operator is going to do a tonsillectomy does not signify that he is doing or has really done a complete tonsillectomy operation.

**Presentation of Pathologic Specimen of Large Tumor of Pituitary Gland.**

By ROBERT C. LYNCH, M. D., New Orleans.

The man was a quadroon, about six feet one inch tall, with hands and feet somewhat larger than usually seen, though not sufficiently so as to be suggestive. He was well developed, to the point suggesting fat, with a fairly developed chest and mammary gland, and small hips, resembling in a degree the feminine type.

About the end of July, 1916, he had profuse nose bleed, following heavy work, with recurrences daily, when the nose began to block up, voice became hoarse and the eyes began to protrude. Upon examination the septum was deviated strongly to the left, the right nostril filled with an irregular, spongy, red mass which bled easily upon manipulation;

pupils were dilated and did not respond to light or accommodation; pulse, eighty; eye grounds show slight pallor with double temporal hemianopia, or loss of vision over the outer half of each eye. A specimen of tissue was removed and the laboratory reported back: "A sarcoma."

The patient in December had the same symptom complex apparent, only slightly aggravated. The exophthalmous was very marked, the superior maxillary prognathism was apparent. The mass in the nose was as described and could be seen in the nasopharynx.

An attempt to remove the mass through the nose only succeeded in getting out a small part. The tissue was reported as granulation, or inflammatory, but not malignant. Upon the second trial a facial decortication was done, and at the same time the right antrum opened. This gave plenty of room to remove the mass more completely, but when the roof of the nose and over both orbits were found pulsating, and with the finger he could feel the meninges and see the dura, he was convinced that it was time to stop, fearing lest the sudden loss of support would produce a hernia.

The nose was packed, a large postnasal plug introduced, tying the attached string to the ear. He was returned to bed in good shape, but upon waking from the anesthesia he caught the string and pulled upon it with such force as to force the postnasal plug through the exposed dura and into the brain. He died from a basilar meningitis.

The specimen was presented for observation, together with the x-ray plates and a microphotograph of the tumor which is characteristic of pituitary gland.

**Report of a Case of Abscess of the Frontal Lobe of the Brain.** By ROBERT C. LYNCH, M. D., New Orleans.

Mrs. L. had been an invalid and a sufferer for considerably more than fifteen years, her condition varying only as to the degree of her suffering, which was often very great. The pain and headache from time to time confined her to bed for varying periods, and frequently the intensity was so great as to cause convulsions, accompanied by a severe rigor and a bending backward, so that whiffs of chloroform were used to bring about relaxation. There were varying terms of slow recovery to a condition that enabled her to leave her bed, but she never was well, and had headaches which were almost continuous.

In 1907, following right sided abdominal pain, an ovary was removed, with no improvement. In 1909, a panhysterectomy was performed; following this a period of relief ensued, but in 1912 the headaches grew so intense that a rhinologist was consulted. A right maxillary sinusitis was irrigated for nearly a year, but with only varying relief. A change was made, and the second colleague removed the right middle turbinate, opened the right frontal intranasally, and curetted the ethmoid cells. There followed a long period of treatment without relief.

Late in 1913 an acute exacerbation in the right frontal sinus occurred, demanding an external operation. There seemed to be no improvement afterward.

Three years later, after careful examination, Lynch found the right antrum to have a large opening through the inferior meatus, and irrigation of this cavity showed slight pus at times, but which bore no relation to the headaches.

The postethmoid region seemed full and bulging, and he was able to wash nearly a teaspoonful of nonoffensive pus from the sphenoid sinus. Treatments of this character seemed to be followed by considerable relief from headaches and relieved the chronic hawking and spitting complained of, though she had during the period of this treatment one of the chill-temperature headache attacks, which seemed to have a certain regularity as to recurrence, regardless of the treatment employed.

There ensued now a gradual decline in body strength and a slight dullness of mentality, with no desire for food and persistent headaches of increasing intensity, blood counts rising to 17,000 with 90 polymorphonuclears. Blood pressure, 110—rather low; no focal symptoms of any kind, as determined by a most searching examination.

The decline reached the state of involuntary micturition and defecation, mental dullness to almost coma, and inability to suck fluids through a straw, to be roused only on the greatest excitement, and speech then inaudible—still no focal symptoms.

On her return to the hospital, some months later, Lynch determined that the symptoms were those of brain abscess in the silent area—the frontal lobe; accordingly, he opened up the old frontal sinus wound, which was apparently perfectly healthy and sound, but to his surprise there existed a small cavity holding about fifteen drops of milky pus, looking much like an old mucocele. On removing the membrane from the posterior wall the bone looked normal and was intact completely. He could not feel satisfied, however, that the findings were sufficient explanation for the symptoms, and took down the posterior sinus wall. The meninges seemed normal and not adherent in any direction, and there was no bulging or undue pressure apparent. He split the dura, and the brain surface seemed normal; so he explored with aspirating syringe and large needle, applying suction as soon as the needle was below the surface. After about an inch deep, following the line of the base of the skull and away from the longitudinal sinus and under the anterior horn of the ventricle, there gushed into the syringe about three drams of yellow green pus. He withdrew the needle and prepared the bone opening and area for the reception of one of Mosher's wire gauze drains; reintroduced the needle and withdrew four drams of pus. Then he opened with a scalpel what he thought was an abscess cavity, but try as he might with needle, knife or forceps, he could find no evidence of the abscess. Finally, he passed a small rubber tissue drain into the brain, in the direction and to the depth of which he had aspirated pus and dressed the wound. Upon recovery from the anesthetic the patient was conscious, and in six hours addressed him voluntarily, complaining of some soreness about the wound, but not of much headache.

The pus showed staphylococcus aureus in pure culture, but not active, growing feebly on culture.

DISCUSSION.

DR. THOMAS H. HALSTED, Syracuse: In this connection I shall report the present condition of a case of hypophyseal cyst which was operated two years ago and reported to this society in 1915. It is the case of a little girl, eight years of age, who at that time had as the leading symptoms great increase in size of her head, great increase in weight, weakness, constant shaking of head with inco-ordination of movements, so

that she was unable to feed herself; optic neuritis, sharp headaches, very striking change in color and texture of hair, polyuria, and disturbed mental acuity. The operation was done through the nose under local anesthesia; it was the modified Hirsch operation, and the growth proved to be a cyst of the hypophysis. The patient was much improved temporarily. Some months later the cyst recurred and a second operation was refused by the parents. It is now about three years since the original operation. I have not seen the child in year, but saw the father within the past six months. He said that the child now has simply an aggravation of all the symptoms; she has become very fat and large with great weakness, and the blindness is nearly total.

DR. HENRY L. SWAIN, New Haven: I would like to ask Dr. Lynch what was the condition of the brain of this patient.

I had a case which I saw but once, in which there was bitemporal hemianopsia which was due to a tumor of the pineal gland, in which there were headaches somewhat similar to the second case.

DR. ROBERT C. LYNCH, New Orleans (closing the discussion): In reply to the question by Dr. Swain, as to what was the condition of the brain of this patient, I would say that the brain did not show anything pathologic at all, except that the coverings represented the usual findings of death from meningitis.

We scraped up in New Orleans three other cases of pituitary tumor, and all of them showed on x-ray a very marked enlargement and beginning protrusion backward of the sella turcica. They all showed the same phenomena as regards the eyebrows, and they all showed the symptoms of lack of function of the pituitary gland.

**Three Bronchoscopic Cases of Dentist's Origin.** By BURT R. SHURLY, M. D., Detroit.

As these three cases occurred during the last decade in a city of an average population during this time of 500,000 people, and as we have an estimated population of over 100,000,000, it might be fair to conclude that possibly six hundred cases of similar accident had occured in the United States and Canada, perhaps, during a similar period. It might, therefore, be of importance to devise a special protective device to prevent the sudden inhalation of foreign bodies during dental procedure.

Again, the question of the medico-legal problem, with questions of responsibility as to whether these accidents involve ordinary care in dental procedure, might be of interest, although exceedingly delicate ground to tread upon, as one of these cases involved a very considerable law suit, and the other two were allowed to pass with nothing more than an attempt to collect the surgeon's fees from the dentist. The medico-legal possibilities did not come to actual trial.

The peculiar relationship of laryngology and clinical medicine and its great importance, one to the other, was again illustrated by the fact that two of these cases first came under my observation as referred cases for clinical examination of the throat and chest on account of long, persistent cough which simulated pulmonary tuberculosis.

*Case 1:* Miss S. stated that her cough dated immediately after the extraction of tooth and gas anesthesia. Radiogram showed tooth. Trachea was not cocainized and bronchoscopy failed. Tracheotomy and subsequent bronchoscopy resulted in removal and cure.

*Case 2:* Married woman. Cough followed nitrous oxid and tooth extraction. There was a marked odor of rubber. The air supply of lower part of lung was cut off, and piece of hard rubber, which had been a part of a dental mouth gag, was brought up to the trachea, slipped from forceps, but fortunately coughed up soon after by the patient.

*Case 3:* Mr. L. W. B., age forty-nine years; architect by profession; was receiving treatment from a dentist preparatory to filling a tooth. The cavity was treated with a dental burr, which in this particular case was held between the thumb and forefinger during the process of application. This tiny instrument suddenly slipped and was inspirated into a lower division of the left bronchus. After this remained in the bronchus for ten days, the patient was sent from his home in the central part of the state of Michigan, to the Detroit Eye, Ear, Nose and Throat Hospital. The x-ray examination reported—anteroposterior and lateral plates were made of the chest: "We find a shadow in the lower left thoracic region, which we think should be interpreted as a metallic foreign body in the lower left bronchus." After a thorough cocainization with novocain of the respiratory passages, with cocainization advanced as the tube was introduced and followed to within the lowest terminations possible, and assisted by Dr. Hickey, I was able to extract this foreign body, which was pointing with the needle part upward. The patient recovered completely without symptoms.

DISCUSSION.

DR. THOMAS HUBBARD, Toledo: It seems that the position of the patient's head in the dental chair is very conducive to the loss of a foreign body in the throat or air passages. Fortunately, most of them go into the gastrointestinal tract. I have in mind a case which recently occurred of a nurse taking dental treatment, in which a small dental burr was lost.

She was taken violently ill and returned to the city with violent abdominal disturbances. The x-ray failed to locate the dental burr; the operation was appendectomy, the surgeon expecting to find the dental burr in the appendix. Had this girl not had the surgical operation, the appendectomy, in all probability the whole thing would have been laid to the dental accident.

Another case comes to mind in which a tooth was lost and remained in for several years and was then spontaneously expelled. The patient was not very ill any of the time and finally expelled the tooth spontaneously.

The third case is that of a patient, a woman, who carried a fragment of Allen's dental cement, which is quite as firm as a tooth structure, in her left lung for seven months, and during that time had all the symptoms of advanced tuberculosis, with a very considerable abscess cavity around it. This brings up the question, as suggested in these cases, of the legal complications. In justice to the dental profession, I believe we should take them into our confidence in all cases of liability on the part of the dentist, and he should be asked to see the operation. This relieves us of any possibility of unfair treatment towards the dentist.

DR. HARMON SMITH, New York City: I wish to call attention to a case more or less similar to the third case mentioned by Dr. Shurly. The patient was having his back upper molar tooth drilled by a burr, as

represented in the third case. The dentist dropped the burr while the patient was in a semirecumbent position with his head backward and drawn to one side. The dentist took up a pair of forceps and when he went to find the burr it was gone. He became alarmed and told this gentleman to have an x-ray taken. The gentleman felt no inconvenience, and instead of that went to a board meeting downtown, and in due course of the day had the x-ray picture taken. It showed the burr in the upper left lobe, and he was then taken to the General Memorial Hospital. He was bronchoscoped, and the bronchoscopist attempted to remove it. He tried for a while and did not succeed, and asked me to come up. I failed, and we decided then to have Dr. Jackson see the patient. In the meantime another gentleman in town was suggested, and he came and failed. Dr. Jackson came on, and he had another x-ray taken to see exactly where the foreign body was located, and he put it down as a case in which it was impossible to obtain the foreign body. It had lodged in the upper outer lobe of the lung. It was recommended by the surgeons that part of the lung should be removed, but the gentleman succumbed to the operation. The burr, however, was obtained.

Dr. Albert C. Getchell, Worcester: I will add two cases to Dr. Shurly's; one following extraction of a tooth under ether. The patient was operated upon and recovered, and the bill was paid by the society by whom the dentist was insured. The second case was a patient seen recently with a cough following immediately upon extraction of a tooth. This patient developed lung abscess, was operated upon and recovered, and then had a recurrence of the abscess.

Dr. Carl E. Munger, Waterbury: I know of a case in which a dental burr was lost and the fluoroscopic view showed it just below the vocal cords. Tracheotomy was done and no dental burr was found. I should say that during the administration of the ether there was a good deal of struggling on the part of the patient, and that the burr was coughed up into the nasopharynx and lodged there. Next morning the patient found something in his mouth and spat it out. It was the dental burr. In this case the dentist paid the bill.

Dr. Bryson Delavan, New York City: I was familiar, as everyone else in our city was, with the case reported by Dr. Harmon Smith. The thing which impressed me most with regard to that case was the futility, as a general rule, of the radical operation for the removal of a foreign body. In looking over a long series of those cases it seems to me, while the observation may not be exactly germaine, unless the bronchoscope will succeed in removing the foreign body, the patient's chances of life are better if time is given before placing him in the hands of a surgeon, than if placed at once in the hands of a surgeon and an operation for the removal of the foreign body performed promptly. This was exactly my attitude at that time.

Dr. Emil Mayer, New York City: I recall the case of a gold crown of a wisdom tooth which was inhaled by a patient. With the valuable help of our member, Dr. Arrowsmith, I was able to remove this successfully. The case occurred about two years ago. One interesting point in regard to that case was that the anesthesia was rectal, which prevented anything like a struggle on the part of the patient, thus possibly dislocating the foreign body; and another point of interest was that as I removed

the gold crowned tooth, Dr. Arrowsmith was standing guard over the patient, with a pair of forceps in his hand, and as that large crown was brought into the mouth and slipped from the grasp of the forceps, Dr. Arrowsmith promptly grabbed it and brought it out.

Dr. Robert C. Lynch, New Orleans: I would call attention to the case of a lady who was having a set of false teeth made and the dentist was using plaster of Paris as for modeling. He put in a cup filled with plaster of Paris and pushed this up, forcing her head back, and the plaster of Paris went down into her lung. This was five years before I made a bronchoscopic examination. I removed nine pieces of plaster of Paris from both lungs. I also found at that time a very marked constriction of the bronchials, and these I dilated, relieving the persistent spasmodic cough completely.

Dr. Stanton Friedberg, Chicago: We may divide the accidents of work on the teeth and other dental accidents into two classes: First, accidents that occur at the time of operation; and, second, accidents that occur from insufficiently attached or loosely attached crowns and bridges.

In one of my cases the cough came on immediately after anesthesia for extraction of a tooth. The cough persisted for a number of months, and the patient was sent to Colorado, where a picture was made, and she then returned to Chicago. There was a small abscess in the lower part of the right lung. The tooth was recovered by upper bronchoscopy, but the abscess persisted. The patient was under observation for three to four months afterwards, without perceptible improvement.

Another case was that of a man who in an intoxicated stupor loosened a bridge consisting of three teeth, which he aspirated into the left bronchus. A picture showed the bridge. On attempting to cocainize the larynx, hemorrhage of the lung started. The tube was introduced, but it was impossible to see anything. A second attempt was made under fluoroscopic bronchoscopy, and although the hemorrhage recurred the foreign body was extracted.

In the third case, that of an aspirated dental broach, upper bronchoscopy could not be done on account of the inability of the patient to open his mouth. In consultation with his surgeon, inasmuch as his symptoms were not acute, we decided not to do a tracheotomy, but to wait until the swelling about the jaw subsided. On account of the fine point of the broach the patient was advised to refrain as much as possible from coughing. Fortunately for him, however, the broach was coughed out several days later.

Dr. John F. Barnhill, Indianapolis: Five years ago some one in Indiana consulted me concerning his daughter, who lived in New Jersey. She said she had had some sort of nasal operation, and on the way home was seized with asthma, and he wished to know what could be done. I suggested that possibly some foreign body had gotten into her larynx or trachea. Later he consulted me again, and requested that he consult Dr. Jackson. She started to Pittsburgh, and on the way coughed out a complete turbinated body that had in some way been inhaled during this operation.

Dr. Burt R. Shurly, Detroit (closing the discussion): I have nothing more to add except to emphasize the fact that there are really a great

many of these cases, apparently. If we got them all together there would undoubtedly be a certain number of cases of lung abscess, the details of which have not been properly looked into, which would prove to be of foreign body origin.

**Sodium Bicarbonate in Ether Anesthesia.** By GEORGE B. WOOD, M. D., Philadelphia.

Modern methods of investigation have shown that both ether and chloroform anesthesia, when prolonged for over thirty minutes, are accompanied by a distinct lowering of the alkali reserve of the blood. It is probable that this mild transient acidosis is a most important factor in the production of post-operative vomiting. It has been further shown that the alkali reserve of the blood can be increased by the administration of sodium bicarbonate, and it is, therefore, a most rational procedure to use this drug routinely as a preoperative prophylactic measure against excessive postoperative vomiting.

DISCUSSION.

DR. EMIL MAYER, New York City: I would like to ask Dr. Wood which dosage of bicarbonate of soda he finds essential in children prior to operation—that is, if one must start with a certain amount of dosage, what practical dosage he has found beneficial.

DR. ROBERT C. LYNCH, New Orleans: I had a sad accident occur to a member of my family which brought this subject pretty closely home, and since that time I have used bicarbonate of soda as a preliminary to all ether anesthesia. Lately we have changed from bicarbonate of soda to citrate of soda as being a little bit more agreeable to the patients. We begin three or four days ahead of the time—that is, preceding the anesthesia—and give doses of bicarbonate of soda or citrate of soda, five grains, and of the former one-quarter of a teaspoonful three times a day. In those cases where we are suspicious of an inclination of the patient to develop evidences of acidosis, we follow the anesthesia always with a Murphy drip, five per cent, glucose solution, one-half pint. This gives our patients very much more comfort and freedom from vomiting. I think the thing is extremely important. It was suggested about three years ago to Dr. Peck, who adopted it. We find that during the intense heat we see many more cases of acidosis occurring then we do in the winter; and always during the spring and throughout the summer months, when we submit a case for general anesthesia, we never omit the preliminary soda treatment and the postoperative five per cent glucose.

We find, also, that the administration of codein and morphin after operation will increase the quantity of acetone in the urine, and predispose to the cyclic vomiting.

DR. GEORGE B. WOOD, Philadelphia (closing the discussion): In answer to Dr. Mayer's question, the dosage should be approximately one and one-half grains of sodium bicarbonate to each year of the child. It should be started the day before the operation, given preferably one-half hour before meals, the last dose being given one or two hours before the operation.

I have not been in the habit of using sodium bicarbonate after the operation unless there is evidence of acidosis, as manifested by constant vomiting or other symptoms, when it should be given by the "Murphy drip."

One other preoperative measure which I think should always be attended to is the proper feeding before the operation. The restriction of food should only be sufficient to assure an empty stomach when the ether is given. The most severe case of acidosis following anesthesia which I have seen was one in which the family physician had, without my knowledge, practically starved the child for twenty-four hours previous to the administration of the ether.

**Removal of Foreign Bodies from the Larynx, Disproving Previously Made Diagnoses.** By HILL HASTINGS, M. D., Los Angeles.

The rapidly growing use of direct laryngoscopy is showing up many incorrect diagnoses, especially in children, where foreign bodies were found in the larynx and trachea. The increasing number of them makes one feel that it is worth while to report all such cases.

Case 1.—Baby L., aged seventeen months, had been sick for a week with "croup," with gradually increasing obstruction to breathing. The father, a physician, and a brother practitioner, had been treating the patient with the feeling that the trouble was "croup," with slight bronchitis. No diphtheritic membrane had been seen in the throat, and cultures from the secretion had been negative for diphtheria. There had been slight respiratory obstruction and a little fever—100.6 degrees the highest. The baby was asleep in bed at the time of our consultation, and was breathing with audible roughness, but without cyanosis and without any considerable difficulty. The possibility of foreign body impaction was suggested, whereupon the father said that he dated the trouble to a little choking spell which the child had had when fed some soft boiled eggs; but that the child had not really suffered much until two or three days later, when the increasing croupy cough and cry and a little fever had made him disregard the choking event. On waking the child its crying increased the dyspnea and brought on some cyanosis, which subsided quickly when the child again became quiet. Indirect laryngoscopy was a failure. The father preferred to await the result of X-ray examination and the use of simple therapeutic measures before allowing direct laryngoscopic examination. The X-ray examination was negative. The child's obstruction grew gradually worse, and direct laryngoscopic examination was agreed to. After a consideration of the danger of operating without a preliminary tracheotomy, it was finally decided to do a tracheotomy. With the use of Jackson's small-size laryngeal speculum, a piece of egg shell was found embedded in the larynx, between the cords, protruding into the glottis. The egg shell was easily removal. Convalescence was uneventful. The tracheotomy tube was not removed for three or four days because of the difficulty in breathing that resulted on attempts to do without it, which supported the contention that a preliminary tracheotomy was advisable.

The history of the second case was rather indefinite. Baby W., sixteen months old, was hurriedly brought from the country to the Cali-

fornia Hospital because of great dyspnea. The child was already on the operating table when the writer first saw it. The only history obtained was that the illness dated back fifteen days to a choking spell that occurred while the child was sucking a piece of mutton chop bone.

Foreign body impaction was at once suspected. Immediate tracheotomy was done without any anesthetic. The patient was practically unconscious from the deep cyanosis. On opening the trachea, immediate relief was obtained and the acute pigeon-breast, tumor-like appearance at once disappeared. The end of a piece of bone was felt at the tracheal opening. The bone, rather firmly impacted above in the larynx, was removed by forceps. It was a large, rather thick sliver, about one inch for diphtheria and had antitoxins, had intubation done on two different discharge and cough continued for a few days. Recovery was complete, and the patient was discharged on the sixteenth day.

DISCUSSION.

DR. JOHN F. BARNHILL, Indianapolis: I have seen two similar cases. One in a child that had been treated for about four days. This child had a safety pin just below the larynx, closed end down. Tracheotomy was done with easy removal of the pin. Complete recovery followed.

Another child, thirteen months old, with exactly such a history and in such a condition as the doctor described in his paper. The child was treated, as I remember, by four different physicians, all for croup. One believed the child had asthma. The X-ray showed a safety pin in such a location, which was easily removed by tracheotomy.

DR. HARMON SMITH, New York City: A case comes to mind of a patient six years of age, treated by six different doctors. It was treated for diphtheria and had antitoxins, had intubation done on two different occasions, and was finally sent to me by a prominent nose and throat specialist to remove a papilloma of the larynx. So I prepared, on his diagnosis, for a removal of a papilloma of the larynx. As I was going to remove it I saw the tip end of a safety pin lodged in the anterior commissure, wedged in between the two vocal cords. After its removal there was no further trouble.

DR. THOMAS HALSTED, Syracuse: I had a case which was more or less similar to the egg shell case. This child was also treated for diphtheria and had antitoxin for two or three weeks, and then a diagnosis of a probable foreign body was made. That was before the days of bronchoscopy. Tracheotomy was done and three pieces of egg shell were removed; the child recovered.

Since the beginning of bronchoscopy I have operated through the bronchoscope two children, eight months of age, one in which we found a fish bone below the vocal cords, which was removed, and in the other a spicule of glass was found, but which was not removed. We got hold of it, but it slipped the forceps.

As long as fifteen years ago I reported seven cases of foreign bodies in children, all between two and three years of age, all seen and operated within a period of two and one-half years. Recovery of the foreign bodies in these seven cases took place by means of tracheotomy. Six of the children recovered, one dying of pneumonia.

DR. T. HUBBARD, Toledo: I have an X-ray plate which somewhat explains how foreign bodies can get into the larynx of young infants. This is a six-weeks-old baby, with a small, open safety pin. It was located in the posterior commissure, and was working down into the larynx.

There is another case I have in mind, of a fragment of hickory nut shell on the ventricle of the larynx, which by passing in pledgets of gauze and drawing up through the larynx finally released the hickory nut shell.

**External Surgery of the Superior Maxilla in Treatment of Nasal Disease.**

By JOHN F. BARNHILL, M. D., Indianapolis.

The difference in the viewpoint and method of attacking nasal tumors of the nostril and its environment depends to some extent, no doubt, upon the degree of surgical training of each class of operator, and also upon the respective ability of each to accurately locate the origin of the growth. In case the origin is from the ethmoid, turbinates, septum or one of the walls of the nostril, the symptoms of early obstruction will cause the patient to consult the rhinologist, who, either from tradition or belief in its greater efficacy, will almost without exception attack from within. If, however, the growth begins without the nostril, the general surgeon often sees it, usually at a late state, and attacks it by those external methods universally approved by his branch of the profession.

Again, and rather frequently, malignant disease of the upper jaw attacks the alveolar process first, and from the fact that the earliest symptoms are neuralgia referred to the teeth, loosening of the teeth, and swelling of the adjacent alveolus, the patient is first seen by the dentist, who has been known to treat the teeth and even to extract healthy teeth, evidently in the belief that the disease is in some way connected with dental surgery.

A study of reported cases of sarcoma especially demonstrates on the one hand that rhinologists often have cauterized and snared at malignant growths in the nose whose undoubted seat must have been in some distant part of the maxilla, while on the other hand the general surgeon has been guilty of removing the entire upper jaw for a disease that had its origin in the nose or in the party line between the nose and antrum.

While it is probably true that the statistics of the rhinologist are better than the statistics of the general surgeon in the treatment of malignancy of the nose and its environment, these statistics are not entirely fair to external surgical methods. It is conceded by all that the length of time a malignant tumor has progressed prior to the operation has much to do with the end results of most operated cases. It is undoubtedly true that the rhinologist and the dentist see malignancy of the maxillae at an average earlier time than does the general surgeon. Sarcoma or carcinoma develop symptoms of distress much earlier when originating in the nose or alveolus than when the origin is in the antrum. Antrum malignancy may progress many weeks or even months before there is external or nasal swelling and before pressure symptoms cause pain.

A candid view of the facts concerning the surgery of the upper jaw for malignancy is not altogether encouraging. The reasons for this are clear, and some of them have been stated. External surgery of the maxilla is essential, usually more essential, to cure than intranasal surgery. The rhinologist who pretends to do radical intranasal surgery should prepare himself to follow surgical disorders leading from the nose to any part of the upper jaw, if not, indeed, to wherever they may lead. When this is done, and when the diagnosis is made earlier than at present, great improvement of statistics may be expected.

All textbooks undoubtedly lay too much stress on total excision of the maxilla, for the reason, apparently, that it is presumed the disease has always advanced to a point that involves the whole upper jaw, or that any procedure short of total excision is inadequate.

One of the chief objections to the external surgery of the maxilla has been the deforming scars, the misplaced eye, and the palatal defects that result. Early and definite diagnosis as to the seat of the beginning of the growth, and an early studied plan of operation, will very largely avoid this objection. Heretofore the plan of operation has been too much a matter of doing one of two things in any given case—namely, some degree of intranasal surgery by the rhinologist, or complete removal of the jaw by the general surgeon. Earlier opportunity and sufficient thought bestowed on any given case on how best to break away from the traditional plan of total resection will in all probability find a satisfactory modified, yet thorough, operation to fit each condition present.

The writer has seen but four cases of undoubted malignancy whose origin was evidently within the nostril. Three of these cases were sarcoma, one epithelioma. All were operated intranasally, with one recovery—a spindle cell sarcoma of the inferior turbinated body. Two cases later extended to the ethmoid and antrum, were operated externally, one dying within about one year following the external operation, and the other within eighteen months. One case returned in the nasopharynx, and was so rapidly extending that the patient lived but a few weeks after the onset of the nasal ailment.

DISCUSSION.

DR. JOSEPH H. BRYAN, Washington: I am very much interested in this paper of Dr. Barnhill's, for I am in favor of external surgery in these cases. I had a case operated upon this spring, not a malignant growth, but an exaggerated fibromatous condition. The face was enormously distorted, the eye greatly displaced, and it was clearly impossible to remove it intranasally. I did the Moore operation, and was greatly pleased with the tremendous facility which it afforded for the complete removal of everything within the maxillary antrum, and also the facility with which it aids in removing not only the growth in the antrum, but the complete removal of the whole nasal wall, including the superior middle and inferior turbinate bodies. In this case, unfortunately, the under surface of the wound became infected and broke down. It healed thoroughly, and while the scar is somewhat on the lower border, it was more than a good result under the circumstances. I believe this operation of Moore is by far the best operation—that is, for complete eradication of all these growths which take place within this cavity. This was

not a malignant growth, but the same thing would apply to any growth which takes place within that sinus.

DR. BRYSON DELAVAN, New York City: The reference to the treatment of nasopharyngeal fibroma leads me to say that I stand exactly where I did when I published the articles on that subject. Of course, there are exceptional cases where the growth has advanced far beyond what is usual; where it involves the sinuses to such an extraordinary degree that it is not practical to apply the treatment—the old fashioned at least thirty-year-old method of procedure of removal by electrolysis, which in the case of the less well developed growths has never been improved upon.

I have never heard of a case dying from the plan of treatment to which I referred, and I have not been able to find any in the literature where death has resulted, and the results are far better in every respect.

Hence, I want to again call your attention earnestly to the value of the electrolytic method of removal.

In any attempt to treat such cases with radium, it cannot be brought into communication with the growth. In those cases the best plan suggested has been the opening of the maxillary sinus, and the best avenue of approach seems to be through the roof of the mouth, where complete access can be gained to the maxillary sinus and where the opening can be kept patent. This is a great advantage, in that it enables the application of the radium to be made.

DR. HANAU W. LOEB, St. Louis: I reported a case a number of years ago in which the tumor was removed by the electric cautery, and in which the hemorrhagic tendency was tremendously reduced by using the electrolysis method.

I may call attention to the ease of going into the nasopharynx by removing the posterior portion of the palate, as I did in a case of carcinoma in the epipharynx, a case not yet reported. The ease with which we were able to remove the mass from the nasopharynx was remarkable.

DR. D. C. GREENE, JR., Boston: The subject as presented involves the field of rhinology occupied previously by general surgeons, and I would like to say a few words with this point in view.

As Dr. Barnhill has said, the tendency has been for general surgeons, in cases of malignant disease of the upper jaw, to perform a stereotyped operation, usually the classical operation, for removal of the upper jaw. In many cases such an operation removes a great deal of healthy tissue unnecessarily, and, what is worse, fails to reach the limits of the disease. It seems to me that we, as rhinologists, are especially qualified, by reason of our technic in intranasal examination, to carry out more careful observation and removal of the diseased tissue than the general surgeons.

I have been fortunate enough to operate successfully on three cases—and there has been no recurrence in either case—of fairly extensive sarcoma of the nose involving the antrum and ethmoid sinuses, in which a complete exposure of the growth was obtained by means of the Moure incision, so that complete removal of the tumor could be effected in each case. The results have been most satisfactory. One case operated on

eight years ago has had no recurrence, another four years ago, and another one a year ago.

My point is that I believe it should be emphasized that we are better qualified to examine and treat these tumors surgically than the general surgeon, because of our general training and technic in intranasal work.

DR. JOHN F. BARNHILL, Indianapolis (closing the discussion): If we can definitely demonstrate that the disease is in the floor of the nose or on the septum, it then seems, judging from statistics, that we are entirely justified in attacking the disease by means of electrocauterization. But if, as may happen, the disease has begun in the nasoantral wall, or has begun in the alveola and spread to the nose, or in the antrum and spread to the nose, or has begun in the ethmoid and spread to the nose, the rhinologist should recognize that fact, and then either send this patient at an early date to a surgeon, or, if he is himself qualified to deal surgically with it, he should do that. It seems to me that the time has come when we should not be guilty of attacking a great subject in a small way, as has been done in nasal surgery of sarcoma.

I emphasized, or tried to do so in my paper, the fact that the general surgeon has not gotten these cases in time to do anything else but make the kind of an operation that he has usually done. We have attacked this disease and worked at the job, as it were, until there was often nothing else to do but to pass it over to the other fellow, and the other fellow often passes it over to the undertaker. There was nothing else to do but to pass it on to the undertaker when it got so far along. But it is possible in nearly every instance, if we use some skill, judgment, care and patience, to make a diagnosis in these cases early enough and operate in time to cure at least many of these patients.

**Report of Cases of Bilateral Abductor Paralysis of the Vocal Cords.** By RALPH BUTLER, M. D., Philadelphia.

The first case was eleven years old, and had congenital syphilitic cerebrospinal meningitis, causing ptosis of the right eyelid and internal strabismus. The biceps, triceps, and knee jerks were absent. The pupils were irresponsive to light and accommodation. The laryngeal symptoms, dyspnea and stridor began when he was six years old, but disappeared after three doses of salvarsan, to recur three years later. The second case was a man sixty-two years old with a neoplasm in the upper part of the chest and neck, including the thyroid gland, and causing almost complete occlusion of the trachea. He had been under observation for five months, and improved under mercurial inunctions. The third case was a fatal one following the removal of the thyroid gland.

The cases illustrate the greater danger from a sudden paralysis. The first two cases have been able to go about for many months with relatively little discomfort from obstructions which were little, if any, less than that which was fatal to the third, in which the paralysis was very rapid in its appearance.

Bert believes the greater mortality from sudden obstruction is due to reflex paralysis of the respiratory centers through irritation of the laryngeal nerves, and Krieger maintains that it is due to irritation of the cardiac branches of the vagus.